Vol. 120, No. 16 **PAPER TRADE JOURNAL** April 19, 1945
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Nekoosa-Edwards Acquires Cutting Rights

Extensive Canadian Timber Areas Include Spence Section Containing Spruce and Jack Pine — Paper Men Attend Traffic Club Dinner—Labor Board Approves Wage Adjustment—Other News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., April 16, 1945—Nekoosa-Edwards Paper Company, Port Edwards, Wis., announced last week that it has recently acquired cutting rights on extensive timber areas in Canada. Cutting of high quality pulpwood is now in progress.

The Spence area, one of the larger tracts, is located about 200 miles northeast of Port Arthur and contains spruce and jackpine pulpwood. The wood will be trucked to the northern end of Long Lac, towed down the lake and the Aquasabon river to Lake Superior. It will then be made into rafts of from 8,000 to 10,000 cords each and towed across the lake to Ashland, Wis., where it will be loaded on cars for shipment to Nepco's mills.

Additional spruce stumpage is owned on the area bordering on the east shore of Lake Nipigon. The wood here will be cut and piled on the Sturgeon river and in the spring will be driven to Lake Nipigon, made into small rafts, towed to the Nipigon river, and driven to Lake Superior for rafting to Ashland.

The third limit is on the west shore of Sturgeon lake about 150 miles northwest of Port Arthur. The area is accessible by air or rail, wood being hauled to the lake head and rafted to Ashland.

Operation of these areas will be carried on through the Alexander-Clark Timber Company, a subsidiary of Nekoosa-Edwards Paper Company. Officers of the paper company are John E. Alexander, president; Donald A. Clark, vice president; N. E. Nash, secretary; Donald Lichty, treasurer. F. G. Kilp, manager of the woodlands department of the paper company, and the above named officers are the directorate of the new organization.

Paper Men Attend Traffic Club Dinner

Valley paper mill and other executives and railroad and truckline officials were among the 250 guests at the first annual industrial dinner of the Fox River Valley Traffic Club at the North Shore Golf Club, near Neenah, Wis., Tuesday evening, April 10.

John S. Burchmore, Chicago lawyer and counsel of the National Industrial Traffic League of America, was the principal speaker, his topic being "Disobedience of the Laws." Andrew Parnell, Appleton attorney, was toastmaster at the dinner, and Walter Fredlund, president of the local Traffic club, gave the welcoming address. Cola G. Parker, president of Kimberly-Clark Corporation, Neenah, gave a short talk as a reply from the executives.

Executives of the various railroads serving the area were the guests of honor. Paper mill executives who were present included: F. J. Sensenbrenner, retired chairman of the board of Kimberly-Clark, Neenah; Mr. Parker; E. A. Oberweiser, president of Fox River Paper Corporation, Appleton; D. K. Brown, president and general manager, Neenah Paper Company, Neenah; George Banta, Jr., president of the Banta Publishing Company, Menasha; Charles Sage, Kimberly-Clark vice president; A. C. Gilbert, president, Gilbert Paper Company, Menasha; R. M. Sensenbrenner, vice president and office manager, George A. Whiting Paper Company, Menasha; Edward Aylward, owner and president, Neenah Foundry Company, Neenah; J. D. Young, president and secretary, Edgewater Paper Company, Neenah; William Gerbrick, president and general manager, Central Paper Company, Menasha; Daniel Kimberly, president, Hardwood Products Corporation, Neenah; Fred Heinritz, secretary, Appleton Coated Paper Company, Appleton; E. C. Hilfert, general manager, Riverside Paper Corporation, Appleton; Roy H. Purdy, president, Tuttle Press, Appleton; William Buchanan, president, Appleton Wire Works, Appleton; Roy Sund, production manager, Marathon Corporation, Menasha; Elmer Jennings, Thilmany Pulp and Paper Company, Kaukauna, and Jack Hewitt, Sr., president and treasurer, J. W. Hewitt Machine Company, Neenah.

Tri-State Mill Workers Meet

The Tri-State Council of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers and the International Brotherhood of Paper Makers met Sunday, April 15, at Peshtigo, Wis. Delegates were present from Wisconsin, Michigan and Minnesota.

After an address of welcome by Mayor A. M. Dohr, the morning session was devoted largely to sectional meetings for pulp mill and paper mill workers and converters.

General meeting of all groups was held in the afternoon at the Odd Fellows hall. The speakers were E. B. Lambton, regional director of the IBPM; E. Noren, A. Pinton, R. Richards and A. Meintz, representatives of the IBPM and International Brotherhood of Pulp, Sulphite and Paper Mill Workers; Ted James, field representative of the Wisconsin State Federation of Labor; Maurice E. Weinberg, Minneapolis, regional director of the Labor League for Human Rights.

(Continued on page 24)

Canadian Paper Industry in Good Position

Favorable Results For Past Year Are Indicated In Reports of Many Paper and Pulp Concerns — R. L. Weldon Discusses Important Phases In Current and Future Prospects — Other Industrial News.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., April 16, 1945—Most of the annual reports of the pulp and paper companies for the year 1944 have now been made available. In general they have revealed favorable results for the year. While some have shown lower earnings, nearly all have improved their working capital position and are making active plans for the post-war period. One cause for satisfaction is the fact now revealed that during the past few weeks one of the great uncertainties as to the outlook of the companies has been cleared up by clear-cut decisions on the part of the taxing authorities providing a base upon which net profits can be more accurately appraised. This has been a matter of uncertainty ever since the excess war profits tax went into effect.

The industry entered the war period at a time when financial reorganization of most of the big companies was being affected, following conditions which had brought about wholesale bankruptcy. The Government recognized that their peacetime "earnings" could not fairly be taken as the standard beyond which additional earnings could be assessed as "excess war profits," and consequently announced that the pulp and paper industry would be classed as a depressed industry, for which there would be modifications of the provisions of the Excess War Profits Tax Act.

What these modifications would amount to was never clearly defined, but it was intimated that the financial position of the various companies would be carefully investigated, and that the tentative decisions as to a standard base of profits could be referred to a Board of Referees. In most cases the matter was ultimately referred to this Board. The investigation of the financial affairs of the companies proceeded over a period of two years, and as decisions have now been rendered by the Board of Referees, the net results of the settlement are reflected in the annual reports of the companies. So far the facts and resulting figures are stated without comment, and it would appear therefore that the standard basis of profits as set up is regarded as fair in regard to all the circumstances. The decisions have come at a time when the companies and the industry generally are anxiously looking forward to post-war developments, and they allow the companies to proceed with their plans on a more assured basis than would otherwise have been possible.

Discusses Post-War Outlook

In regard to the post-war outlook, R. L. Weldon, chairman of the Executive Board of the Canadian Pulp and Paper Association, says that the problems of the industry are integral parts of the post-war problems of Canada as a whole. He points out that the tremendous increase which has taken place during the war in the potential industrial capacity of Canada can become a grave threat to our economy if not properly understood and properly utilized. Canada's task is to find economic world markets for her products. That in turn depends upon Canada's ability to supply the world with the commodities we produce at a price and of a quality which can meet the competition of other countries. This is complicated by the fact that never before in history has the trade of the world been so completely disrupted by war and never before in history have so many problems faced the peace makers. More and more, he says, it becomes important to establish clearly a proper and adequate understanding of collaboration between government and industry.

"The rest of the world," he emphasizes, "is not at all interested in our standard of living, the wages we pay, the profits we make, nor in the economic conservation of our natural resources."

Pointing out the pre-eminence of Canada in the world supply of pulp and paper, both before and particularly during the war, he says the fact stands out that the industry is one of Canada's greatest sources of export income, having in the past consistently exceeded wheat, nickel or any other Canadian products except gold. The industry, he points out, has no major reconversion problem to deal with in the post-war years and further its plants are, with the exception of a certain amount of deferred maintenance, in reasonably good physical condition.

Sees Expansion in Pulp Manufacture

Apparently he looks for a considerable expansion of the pulp manufacturing end of the industry, of which, prior to the war, Canada produced about 20% of the world's supply. Says Mr. Weldon:

"The war years have brought home as never before the significance of pulp and paper as a basic essential to industrial production and distribution.

"It is well known in the industry that there existed, prior to the war, a surplus of capacity for the production of pulp and paper in relation to the then world demand. In spite of this a recent survey by the United States Department of Commerce states: 'In future years increased wood pulp production in terms of millions of tons will be needed.'

"How then can Canada share in this anticipated demand? What problems will the industry meet and what planning should be done?

"The divergence of the two statements in respect of over capacity to produce and the necessity of millions of tons of additional wood pulp production pose a grave and important problem to this industry. Unbridled, uneconomic expansion of facilities to produce pulp and paper would soon put the world industry and Canada in the same position as before the war. On the other hand failure to supply markets on a quantitative, qualitative and economic basis will be our failure to properly take advantage of our natural resources."

To the above may be added the fact that increasing costs of manufacture are a matter of anxious concern. As typical it may be mentioned that one company reports that the principal raw materials, such as alum, coal, felts, pulpstones, resin and pulpwood have increased in price by over 50 per cent since 1940, while basic wages have increased by approximately 45 per cent since May, 1940.

The VICKERY
FELT CONDITIONER

UPS PRODUCTION TWO WAYS

1. It eliminates mid-week paper machine shut-downs for cleaning clogged press felts. Vickery Conditioned felts are continuously clean, fresh and absorbent.

2. It assures maximum water removal at the presses. This takes much of the burden off the dryers where water removal is a much slower and costlier proposition.

Get in touch with us if there's any question of press felts plugging up production on your *machines.*

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Chicago Concerned at Short Paper Supply

Market Comment Reflects Opinion That Low Point In Supply Will Be Reached In Current Quarter — Waste Paper Collections Are Reported Improved—Salesmen Receive Thanks—Other Late News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., April 16, 1945—With two of the six major shortages, paper and pulp and chemicals, still confronting them, paper trade executives in this area are hoping against hope that the European phase of the war will be over soon enough to permit pulp shipments from Sweden before July 1. If that situation prevails the present quarter will, in the opinion of Chicago paper men, be the low point of the war in civilian sales and the high point in shortages. At the present time not only pulp but chemicals, and manpower, make the situation a critical one. The bottom of the barrel is being scraped in many a Chicago warehouse. But if the Swedish situation becomes an actuality instead of a hope then the third quarter should show some improvement, say local reports. Even if and when both wars end, the local trade expects it will take all of next year to get back to some semblance of normalcy.

Meanwhile, locally, the "military papers" are taking up all available pulp supply and substitute papers, some time ago "glorified" into number one usage, are rapidly disappearing. Books and covers were among the tightest items in the market. Sulphites of all grades were in a similar condition while the board market was reported as tight as it has yet been—if not tighter. Bonds and ledgers showed no change. Waste paper pick-ups were improved with warmer weather and the Chicago market continues to exude pride over the results of its salvage program.

Salesmen Receive Thanks

One of the quiet but none-the-less sincere gestures of the Salesmen's Association of the Paper Industry which has gone more or less unnoticed, is to be rewarded at the next meeting of the western division of the association on April 30. The Reverend Frederick D. Barry, Rector of St. Lukes Episcopal Church of Evanston is to be the speaker at the noon luncheon at the Hotel Sherman. He is going to do something he is reported to have wanted to do for a long time—publicly thank the salesmen for the things they have done for his church and for their past Chaplain, Dr. George Craig Stewart. Over a year ago the church began a Memorial Fund for Bishop Stewart who was widely and most favorably known by paper trade executives throughout the country. The Salesmen's Association of the Paper Industry wholeheartedly backed the Fund idea and subscribed generously. Now Reverend Barry, Rector of the church where Bishop Stewart made his tremendous contributions to business and religious life, comes to the western division of the association not only to deliver an inspiring message but to extend his thanks to the association for its assistance. It is expected to be one of the really "big" days in association history.

Saving Newsprint

Of interest to the paper trade is additional information from the Inland Daily Press Association, Chicago, showing how more and more newspapers are conserving newsprint with special condensed editions for servicemen. This week, the Press Association reported newsprint conservation programs from Sheboygan, Wis., Fond du Lac, Wis., New Castle, Ind., and Davenport, Iowa. All have been popular with the servicemen and have helped the newspapers materially in staying "under their budget" newsprintwise.

To Conserve Materials

The Midwest Gummed Paper Company has produced a large wall chart which is proving popular in shipping departments as an aid in conserving paper and materials and as a means of genuinely increasing shipping efficiency and of protecting the product being shipped. The chart illustrates methods of properly sealing cartons with no wastes of either wrapping materials or tape and actually increasing the protection to the article. It depicts eight steps to be followed in applying the sealing tape to carton sealing lines and contents and tells, on the chart, just why economies are so important at this time. The "Green Core Sealing Tape Chart" is 12 by 18 inches in size and has two eyelets for wall hanging. It may be secured from MidStates Gummed Paper headquarters in Chicago.

Container Sales Up Sharply

Some idea of the tremendous demand coming from the container industry is reflected in the recent report to its stockholders of the Continental Can Company. A sales increase of 34% over the previous year was reported in paper and fibre containers. The company also reported increasingly alarming shortages in pulp and in manpower.

Rockwell Adds New Item

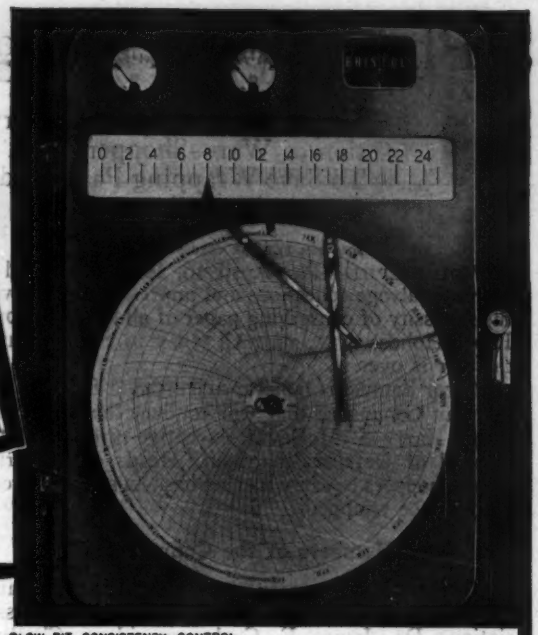
"Rockweave" Embossed Blotting Paper is a new item in the Rockwell Barnes line of specialties for the stationer. The Chicago concern has a distinctive and exclusive design dandy-rolled into its first quality blotting. The design is a replica of the unusual motif in the table legs made for T. J. Salsman, head of Rockwell Barnes. There are thirteen sparkling colors in the 100 pound stock which comes in two popular sizes, 19 by 24 and 24 by 38.

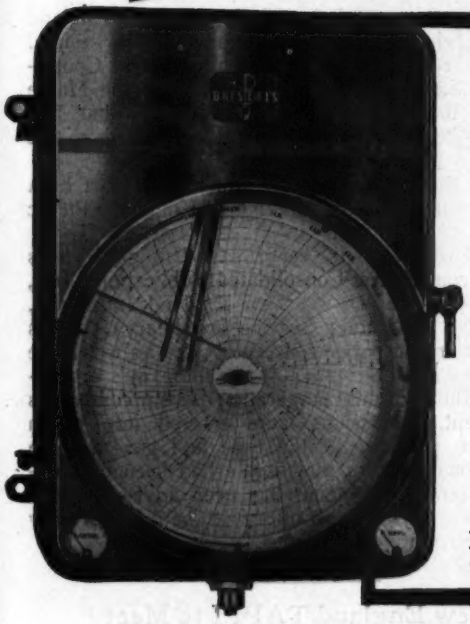
Harry C. Brown Dead

Harry C. Brown, planning engineer, Crossett Paper Mills, Crossett, Ark., died recently. Mr. Brown was born in Amherst, N. S., on July 2, 1890 and graduated from McGill University as an electrical engineer in 1917. He was formerly a draftsman for the Wayagamac Pulp and Paper Company, Three Rivers, P. Q., plant engineer for Belgo Canadian Paper Company, Shawinigan Falls, P. Q., manager of power development, Newfoundland Power and Paper Company, Corner Brook, Nfld., assist. chief engineer, International Paper Company, New York, N. Y., and power engineer, Union Bag and Paper Corporation, Savannah, Ga. He was a member of the Technical Association of the Pulp and Paper Industry.

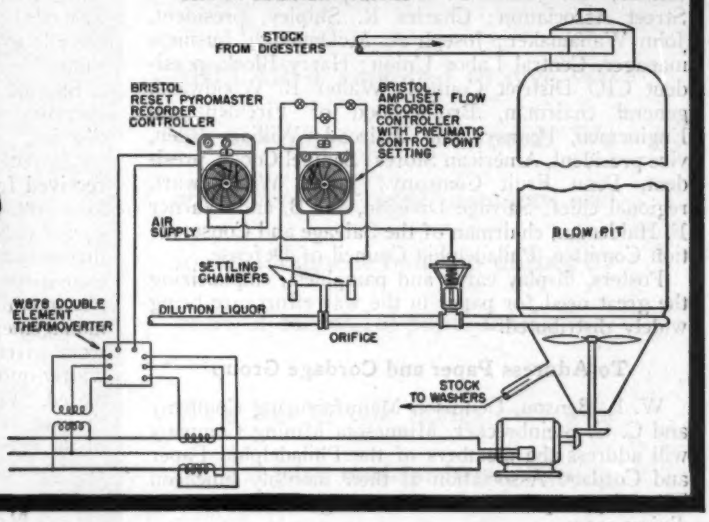
These Bristol Instruments for Blow Pits

WILL AUTOMATICALLY HOLD THE CONSISTENCY OF THE OUTGOING STOCK AT A CONSTANT VALUE





BLOW PIT CONSISTENCY CONTROL



Rate of flow of dilution liquor through the control valve is subject to two variables: variations in level in black liquor storage tank, affecting upstream pressure; variations in head of pulp in the blow pit, affecting downstream pressure.

To protect against the several possible dangerous conditions resulting from high consistency stock, Bristol Instruments have been installed, operating as follows:

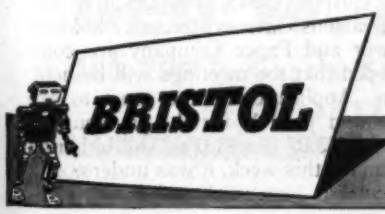
Bristol's Ampliset Flow Recorder Controller operates the synchro valve to hold flow constant.

Bristol's Reset Pyromaster Wattmeter responds to changes in motor load (caused by changes in consistency of stock from digester) and sets control point on flow controller to a higher or lower value.

This application of Bristol Instruments should be attractive to any sulphate pulp mill planning a modernization program.

THE BRISTOL COMPANY, 159 Bristol Road
WATERBURY 91, CONN.

The Bristol Co. of Canada, Ltd. Toronto, Ontario
Bristol's Instrument Co., Ltd. London N W 10, England



Engineers Process Control for Better Products and Profit

AUTOMATIC CONTROLLING AND RECORDING INSTRUMENTS

THE BRISTOL COMPANY, Waterbury 91, Connecticut

The Bristol Co. of Canada, Ltd. Toronto, Ontario
Bristol's Instrument Co., Ltd. London, N. W. 10, England

Philadelphia Inaugurates Paper Holiday

Mayor Samuel Opens Conservation Drive To Continue For Duration of War—Shoppers Will Be Urged To Carry Market Baskets To Save Wrapping Paper and Bags—V. A. Dirvin Is Convalescing.

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., April 16, 1945—Designed to increase salvage collections and impress everyone with the necessity of conserving paper of all kind, National Paper Holiday was launched today to continue until the war is over.

Mayor Samuel is honorary chairman of the Special Holiday Committee that will conduct the drive with Judge Harry S. McDevitt, executive director of the Council of Defense, chairman. Heads of the drive urged shoppers to carry market baskets so that parcels need not be wrapped.

Members of the Committee

Members of the committee include Arthur C. Kaufmann, president of the Philadelphia Merchants Association; Dr. James F. Cooke, president, Chestnut Street Association; Charles R. Shipley, president, John Wanamaker; Joseph A. McDonough, business manager, Central Labor Union; Harry Block, president CIO District Council; Walter B. Woodward, general chairman, Brotherhood of Firemen and Enginemen, Pennsylvania Railroad; William Eden, vice president, American Stores; Samuel Cooke, president, Penn Fruit Company; James W. Stewart, regional chief, Salvage Division, WPB, and Warner F. Haldeman, chairman of the Salvage and Conservation Comittee, Philadelphia Council of Defense.

Posters, display cards and pamphlets, emphasizing the great need for paper in the war effort, are being widely distributed.

To Address Paper and Cordage Group

W. L. Benson, Dennison Manufacturing Company and C. G. Steinbrecker, Minnesota Mining Company will address the members of the Philadelphia Paper and Cordage Association at their monthly luncheon Thursday, April 19 in Strawbridge and Clothier's dining room.

Annual Outing June 21

Carroll Gardner, president of the association, announces that the annual outing will be held all day Thursday, June 21, at the Manufacturers Country Club, Oreland, Pa. This outing is conceded to be the biggest event in the activities of the association, always having an overflow attendance, and says president Gardner, "Judging from the reservations that are being received, this year will far surpass all others for attendance." There will be golf, quoits, etc. with prizes galore and a keg of beer at the 9th hole. In the evening the regular dinner will be served at the clubhouse, at which time the awards will be made.

V. A. Dirvin Home From Hospital

Vincent A. Dirvin, secretary of Paper Manufacturers Company, 5th and Willow streets, has returned home from St. Joseph's Hospital, where he was being hospitalized. Vince, as he is affectionately known in the paper trade, was handling government contracts for the company and was working under presure every minute of the day until the strain manifested itself to a degree that his physician ordered him to the hospital.

He is now his old self again and before long will be back at his desk, and it is our guess that his right hand will be put out of commission from the handshakes he will get, judging from the number of friends who have been making inquiries about his health and are awaiting his early return.

Not To Buy Maine Seaboard Mill

AUGUSTA, Me., April 16, 1945—The New England Public Service Company said today in its annual report regarding negotiations of the Hearst Consoldated Publications, Inc., for purchase of the Maine Seaboard Paper Company, a subsidiary, that "no offer is to be made in view of the uncertainty of the times."

Sale of the paper company would be a part of a current reorganization of New England Public Service.

"In August, 1944," the report said, "an inquiry was received from Hearst Consolidated Publications, Inc., as to the possible sale by New England Industries, Inc. (a N. E. Public Service subsidiary), of its investment in the paper concern. After an extensive examination had been made of the company's properties and affairs with the cooperation of your company's management, discussions were entered into which were given publicity at the time and gave rise to widely-quoted rumors that a sale had been consummated. Your management has been advised within the past few days that no offer is to be made in view of the uncertainty of the times."

New England TAPPI to Meet

The New England Section of the Technical Association of the Pulp and Paper Industry will meet jointly with the Connecticut Valley Division of the Superintendents Association at the Norwich Inn, Norwich, Conn., on May 25-26, 1945. Visits to several paperboard mills will feature the Friday afternoon program. An excellent program is being prepared by Ollie W. Messner of the Robertson Paper Box Company.

Abitibi Payment Expected in June

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., April 16, 1945—Preparations for the meetings of the various classes of security holders of the Abitibi Power and Paper Company are continuing and it is hoped that the meetings will be held not later than June. Application to the court to set a date, probably around June 1, for the payment of the second amount of $43.07 per $1,000 Abitibi bond, was expected to be made this week, it was understood, but no announcement has been made public.

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YOUR batting average in post-war selling will depend as much on the marketing channels you choose as on the quality of your lines.

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We'd like to talk things over with you . . . plan now for better batting averages when competition again gets tough.

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WORCESTER, MASS. • HARTFORD, CONN.

Central States Paper Co. Buys Building

As a concrete step in their postwar planning program, the Central States Paper and Bag Company, of St. Louis, has recently purchased the three-story building shown in the photograph. It contains 181,000 sq. ft. of floor space.

In addition to volume production of custom made paper bags for every conceivable purpose, the firm's Showbox Division, before the war, pioneered in the manufacture of rigid, transparent containers. They were leaders in the rigid, transparent packaging field, and postwar plans include expansion of this activity. They are also jobbers and distributors of wrapping and printing papers. The company is in its 25th year.

Although the company's president, Captain Sidney Abramson of the United States Army, is overseas for the second time (he served also in World War I) his four brothers, two of whom also served in the last war, are carrying on the business in his absence and were responsible for the purchase of the building.

Occupied at present by Continental Can Company, the building will accommodate all the production and office equipment and around 800 employees, which the company now has divided among three separate units throughout the city, and will allow future expansion. It is concrete, fireproof, and equipped with steel sash window casings, fluorescent lighting, a sprinkler system, and heating throughout.

The physical set-up is especially well-adapted to the type of manufacturing done by Central States Paper and Bag Company. Truckloading and railroad sidings are at opposite ends of the building to permit streamlined production. On one side is a private railroad spur which will accommodate seven freight cars at a time. A large loading platform for trucking is on the other side. These unusual facilities are needed to insure a constant supply of necessary materials and transportation in and out. The building is completely wired for industrial purposes and contains two large freight elevators. Abundant parking space is available on the plant grounds in the three surrounding streets.

An ample display room, fitted and designed to show the company's many products, is being planned now by one of the city's leading designers. As soon as the present tenants vacate, the building will be remodeled to suit Central States' organizational and production requirements. New machinery, purchased to increase productive capacity, will be placed in the new quarters as soon as possible.

Although the company is still actively turning out almost 100% war production, having been among the first to turn its facilities to producing for the war effort, plans are now being made to convert to peacetime production with items formerly manufactured and new ones as soon as changing conditions will permit.

Well-located industrially, the new home of the Central States Paper and Bag Company is just a few blocks from one of the sites chosen by Famous-Barr for a new department store in its postwar program of decentralization of the over-congested shopping area, and is near the General Motors plant and many other prominent manufacturing concerns.

While Captain Abramson, the President, serves with the armed forces, Elmer D. Abramson, Secretary, and Alvin D. Abramson, Treasurer, are in charge of the plants and organizational operations. H. L. Abramson, Vice-President, is in the New York office, and M. L. Abramson, Vice-President, is in charge of the Chicago office. The firm also has branch offices and representatives in principal cities.

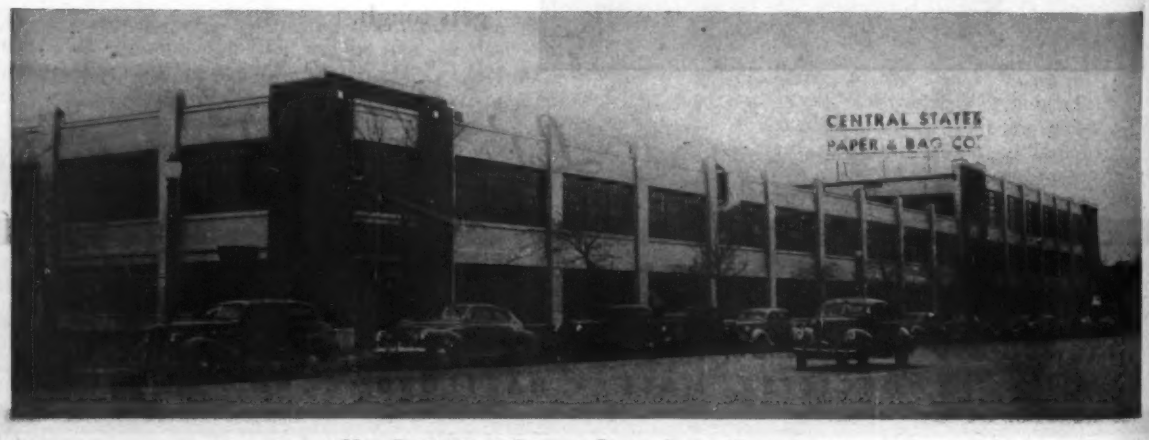
Made Warren Pump Representatives

Warren Steam Pump Company, Warren, Mass., manufacturer of a complete line of centrifugal and reciprocating pumps, announce the appointment of C. E. Johnson & Associates, 401 Bona Allen Building, Atlanta, Ga., as sales representatives. Their territory will comprise the State of Georgia, eastern Tennessee, northern Alabama and eastern Florida.

C. E. Johnson & Associates are well and favorably known in the South Eastern area and the addition of Warren pumps to their other nationally known lines is expected to still further increase their prestige in the equipment field.

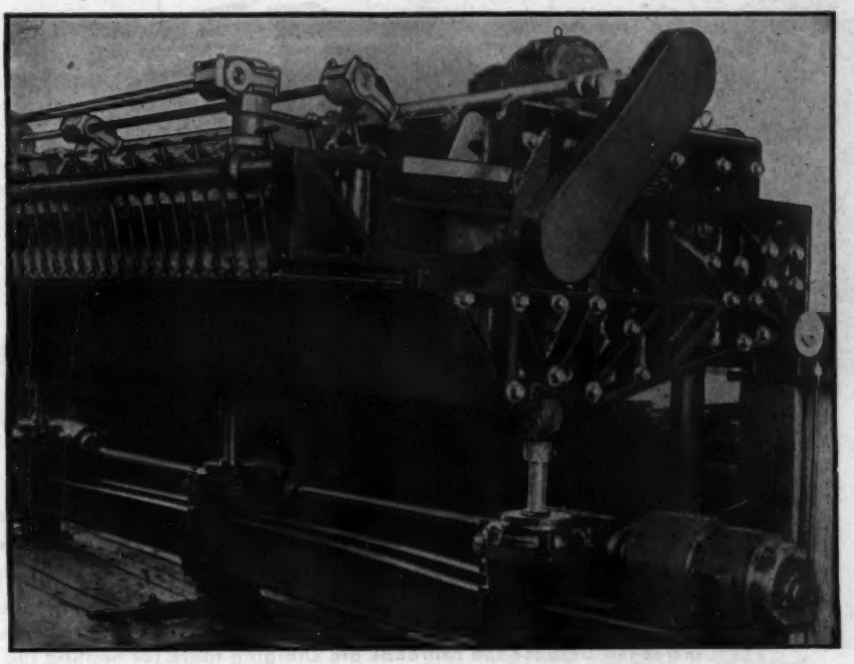
Rahmann Observes 50th Anniversary

George Rahmann & Co., Inc., New York, in commemorating the fiftieth anniversary of the concern in the machinery belting industry, gave an informal dinner on April 12 at the Hotel McAlpin, New York.



New Building of Central States Paper Company

THIS IS A *PRESSURE* INLET



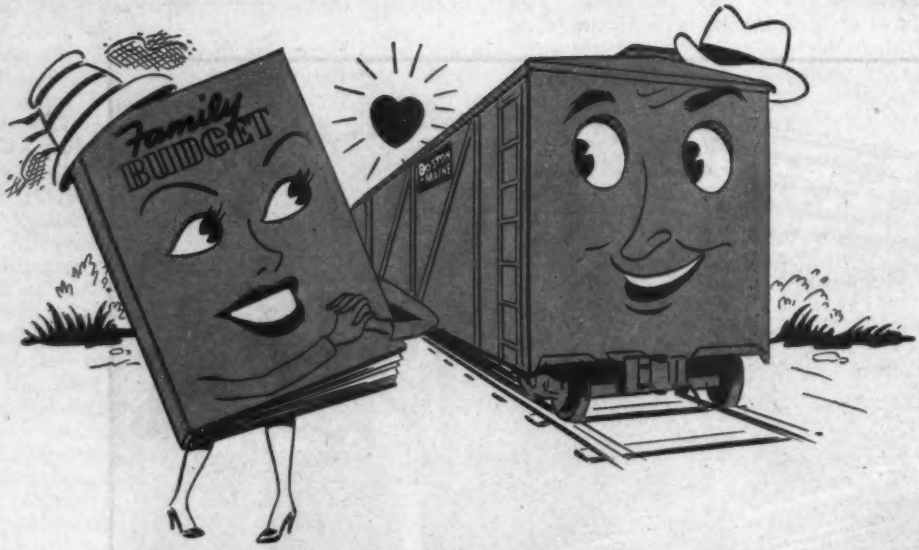
To the casual eye, the above cut does not necessarily indicate a high speed Inlet. But examination of the heavy structural design and the totally enclosed construction all point to pressure —HIGH PRESSURE—to synchronize the speed of the stock with the highest wire speed ever run on a paper machine. This necessary pressure is obtained by direct pumping or by use of a specially designed headbox. For high-speed, free and lightweight sheets.

Available After the War

VALLEY
IRON WORKS COMPANY
APPLETON, WISCONSIN

Slices and Head Boxes • Screw Presses • Micro-mist Spray Dampeners • Laboratory Equipment
Pulp Washing Systems • High-Speed Beaters • Breaker Beaters • Vortex Beaters • Plug Valves
Flat and Rotary Screens • Thickeners • Deckers • Paper Markers • Roll-Headers

Your Budget's Best Friend is a BOX CAR!



You never thought your battered wartime budget had a friend, did you? But it has! Although almost everything else costs you much more than in 1939, railroad freight rates are still on the same level today as they were in that year. Railroad freight rates are not adding one cent more to your cost of living today than they did at the time of Pearl Harbor. So don't let anybody tell you that your cost of living has increased because the railroads are charging more for hauling the things you buy.

A 25-pound ham can still go places by rail for less than 25 cents

Maybe your Easter ham did cost more this year than in 1939, but it wasn't because of its traveling expenses! It *still* costs less than 1¢ a pound to ship a ham all the way from Chicago to Boston . . . only 2½% of its final cost to you at your local market. And the freight rate for hauling a 5-pound bag of flour from Minneapolis to Boston is less than 2½¢ . . . just as it was six years ago. And what about clothing? The charge for shipping women's shoes from New England to Chicago is less than 1½¢ a pair! These are but a few examples of what the B and M, and other American Railroads, are now charging for carrying the things you buy.

YOUR taxes could be worse!

Yes, that's right; were it not for the railroads (and that includes Northern New England's B and M), that withholding tax you've felt like grousing about might be even HIGHER. At the time of the last war, the Government took over the operation of the railroads. The resulting deficit — which the taxpayers had to pay — was $1,282,051 a day. During World War II it has been a different story. This country's railroads have been on their own and in 1944 contributed over $5,000,000 a day *to* the Government in taxes. That's another way the railroads are befriending your family budget. Last year the Boston and Maine's tax bill (Federal, state, and local) was $8,498,787.

Race of the century: rising operating cost vs. increasing efficiency

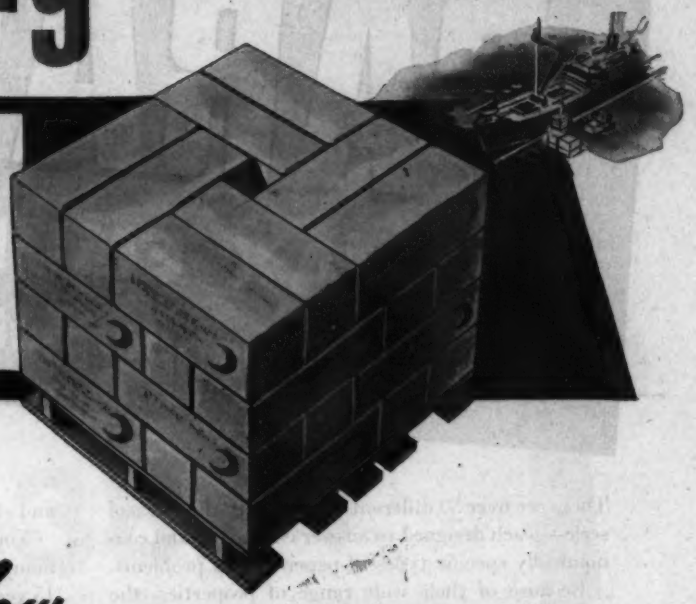
Since 1939 our annual payroll has shot from $21,394,122 to $41,227,138; our annual taxes from $3,519,723 to $8,498,787; our annual bill for materials and supplies, including fuel, from $7,542,385 to $15,440,389. BUT FREIGHT RATES ARE *STILL* LOW . . . the railroads still carry a ton of freight at an average cost of *less than* 1¢ a mile just as they did back in 1939. How are we able to do this? By continually improving our operating methods (making the same number of cars do more work, for example); by purchasing motive power that can haul longer trains at lower costs; and by receiving helpful cooperation from our employees, shippers, and the general public.

Boston and Maine will continue to serve you by providing fast, efficient, low cost transportation.

OUR FREIGHT CARS WILL *ALWAYS* BE YOUR BUDGET'S BEST FRIEND!

BOSTON *and* MAINE

Palletizing WITH ADHESIVES

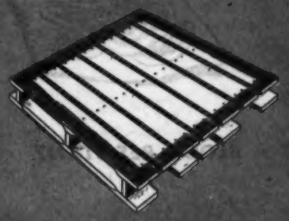


EXCLUSIVE!

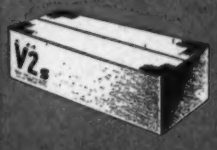
PALLET ADHESIVE # 4 was formulated in collaboration with military authorities. It is the first adhesive to be tested and approved for unitizing corrugated or solid fibre shipping containers on standard wooden pallets. Its high shear strength locks the unitized load during shipping; its low tensile strength permits easy unit separation during unloading — with a minimum of tearing that leaves the cases fit for reuse. Adhesive palletizing is now being adapted to wooden boxes.

SAVES	PREVENTS
Steel	Break-up
Labor	Damage
Time	Pilferage
Containers	

EASY TO APPLY



PALLET ADHESIVE # 4 is applied by brush around the perimeter of the pallet. Then the first layer of cartons is placed in position.



An L-shaped strip of adhesive is then applied to the top corners of each carton — to lock the succeeding layers in place.

Now SPEEDS MULTIPLE-UNIT WAR DELIVERIES

All war contractors—large or small—can now make palletized shipments *whether* or *not* they are equipped with special tools for steel strapping and mechanical handling equipment.

A fast-setting, mold-proof, brush applied adhesive . . . National's PALLET ADHESIVE #4 . . . permits unit loading either inside the plant at the delivery conveyor — *or directly on pallets in the freight car or delivery truck.*

Domestic shipments to prime contractors equipped with fork-lift trucks — or to the home depots of the Services *need no further binding.*

Overseas shipments can be 3-strapped (instead of 6-strapped) by the Services at ports of embarkation or by specially equipped contractors.

Government specifications calling for palletized units are rapidly being extended to all contractors. The advantages of palletizing with adhesives are many: Unit loading saves time, labor, critical metal and handling equipment. Rehandling caused by load break-up is eliminated. Damage in transit is lessened. Pilfering is discouraged. And savings in container costs are made possible.

Further information is available NOW! Address: National Adhesives, 270 Madison Avenue, New York 16; 3641 So. Washtenaw Avenue, Chicago 32; 735 Battery Street, San Francisco 11, and other principal cities. In Canada: Meredith, Simmons & Company, Ltd., Toronto and Montreal.

National ADHESIVES

EVERY TYPE OF ADHESIVE FOR EVERY TYPE OF ADHESION

MORE THAN 50 DIFFERENT

PARACOL*

WAX EMULSIONS

for your papermaking problems

There are over 50 different emulsions in the Paracol series—each designed to answer effectively and economically specific types of papermaking problems.

Because of their wide range of properties, the Paracol emulsions permit virtually "tailor-made" selection. Choice of the correct Paracol is determined by many factors—involving where and how applied, and effect desired in the finished sheet.

Your PMC technical representative knows these many factors intimately—through our more than 15 years experience in making emulsions and applying them to papermaking problems. For further information on the use of Paracol emulsions in your operations, use the convenient coupon below.

WATERPROOF ★ GREASE RESISTANT ★ INK REPELLENT ★ TRANSLUCENT ★ BLOOD RESISTANT

Scores of paper mills throughout the country are using to their advantage the research knowledge and technical training of Hercules representatives. This helpful service is at your disposal for all your important papermaking problems.

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*Reg. U. S. Pat. Off.

PMC

HERCULES POWDER COMPANY
INCORPORATED

Papermakers' Chemical Department,
962 King Street, Wilmington 99, Delaware

Gentlemen:

Please send me information on .....

.....

Name.....Title.....

Firm.....

Address.....

PI-43

WHAT ABOUT M-387?

This advertisement from last year takes on added significance under today's restrictions on rosin size. Let us help you apply the Paracols as extenders. *Write, wire, or phone!*

Urges Salvaging of More Waste Paper

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., April 18, 1945—The need for salvaging all possible waste paper as a contribution to the war program is greater in 1945 than ever before, according to the Department of Commerce.

Prepared by Donald Collier of the Pulp and Paper Unit, the report is one of many projects on which the Bureau of Foreign and Domestic Commerce has worked with Government and business in wartime.

In a foreword Secretary of Commerce Henry A. Wallace says: "The Department of Commerce recognizes the importance of paper in the war program. Waste paper serves as a raw material for making many types of paper and paperboard products essential to the prosecution of the war. Conscientious efforts must be exerted by every citizen, young or old, to meet the established waste paper goal for 1945."

Last year waste paper collections of 6,900,000 were above normal by about one million tons. Speaking of last year's campaign the report says: "The success of the 1944 waste paper drive is one of the civilian victories of the war. To achieve a similar victory in 1945, thereby assuring a truly successful salvage program, will require an increasing amount of effort by a greater number of volunteers."

Last year's record collections were achieved despite the fact that the voluntary participating organizations had a million tons less salvageable paper to draw upon.

The drive this year for a total of 8,000,000 tons of waste paper will test the skill and ingenuity of all collecting groups. With a 1945 goal 1,000,000 tons above last year's collections, it is estimated that this higher figure must be obtained from waste paper accumulations below those available in 1944.

BUILDERS
Propeloflo
IMPROVED PROPELLER-TYPE FLOW METER
Streamline Venturi design gives exceptional accuracy through a wide range of flow with low loss of head. Simple to install; low first cost; low upkeep.
Send for Bulletin 350. Address Builders-Providence, Inc., (division of Builders Iron Foundry), 9 Codding St., Providence 1, R. I.
Sincerely
BUILDERS-PROVIDENCE

ACQUIRES CUTTING RIGHTS

(Continued from page 11)

The banquet in the evening was held in the high school gymnasium, with E. A. Meyer, president and general manager of the Badger Paper Mills, Inc., Peshtigo, as the speaker.

Navigation Opens on Fox River

Since navigation opened April 9, the first boat through the Fox river locks at Appleton, Wis., was the tug "Carter" with a barge on its way from Oshkosh, Wis., to Green Bay, Wis., for a load of coal. The tug and barge passed through the locks last Tuesday evening.

Bergstrom Employees Organize

Employees of the Bergstrom Paper Company, Neenah, Wis., organized a union at a meeting Sunday, April 8, at the Menasha Labor hall. The union will be known as the Winnebago local and is affiliated with the International Brotherhood of Paper Makers (AFL).

Labor Board Approves Wage Adjustment

Wage adjustments at the Fox River Paper Corporation, Appleton, Wis., have been approved by the Sixth Regional War Labor Board. The board sanctioned a 2-cent hourly shift differential for employees on rotation shifts and an average increase of 2 cents an hour, the method of distribution of which is to be negotiated between the company and the local of the International Brotherhood of Paper Makers, but providing that the present 65-cent rate for common labor remain unchanged and that all rates below 55 cents shall be brought up to at least 55 cents to correct existing sub-standard rates.

Approval also was announced for intra-plant wage adjustments based on job analysis as jointly applied for the Whiting-Plover Paper Company, Stevens Point, Wis., and the International Brotherhood of Paper Makers, as of April 10.

Will of Mrs. Alexander Filed

The will of Mrs. Lida Edwards Alexander, daughter and widow of the founders of the Nekoosa-Edwards Paper Company, was filed Monday, April 9, in Wood County court at Wisconsin Rapids, Wis. Mrs. Alexander died April 1 at her home at Port Edwards, Wis. Personal property was listed at $400,000 and real estate of $35,000.

The bulk of the estate was left to a son, John E. Alexander, president of the Nekoosa-Edwards Paper Company, her only immediate survivor. The homestead, including buildings and improvements and personal property in the buildings designated by executor, were given to the village of Port Edwards to be made into a memorial park.

Melvin Farris Goes With Southland

LUFKIN, Tex., April 19, 1945—Southland Paper Mills, Inc. wishes to announce the appointment of Melvin Farris as Superintendent of the kraft mill.

Mr. Farris has been promoted to this position from tour boss at Southland Paper Mills. Mr. Farris came to Southland Paper Mills when the kraft mill started up in 1944 after many years experience in the kraft industry, both in the South and the West Coast.

The Dorrco Slaker does the work of *both* slaker and classifier. It is a single, self-contained unit. Operation is simple and safe, and overall installation costs are lower than for usual two-unit layouts. Further economies occur in operation and maintenance.

INSTALLATION ECONOMY The Dorrco Slaker is complete, ready to bolt to the floor. No foundations are required, as with other type slakers; there is no extra expense for erecting connecting launders between slaker and classifier because the Dorrco Slaker is all one unit. All protective hoods and covers are provided. A competent Dorr field engineer oversees Dorrco Slaker installations.

OPERATING EFFICIENCY Adequate provision is made in the classifier section of the Dorrco Slaker for removing unusual quantities of grit. Fine separations are assured by the Dorrco Slaker's ample pool area and volume.

LOW MAINTENANCE COST Tank liners of the Dorrco Slaker are durable white iron. Long life even under severe abrasive and corrosive conditions is therefore assured before replacements become necessary—*and Dorrco tank liners are replaceable.* When replacements are necessary, they are less expensive than with units which require complete new tanks or drums. Another low-maintenance feature of the Dorrco Slaker is the complete absence of submerged bearings exposed to caustic solutions and grit.

DORRCO Lime Slakers are made in six standard sizes, with capacities up to 200 tons of CaO per 24 hours.

7906

Communicate with the nearest DORR office for further information.

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PETREE & DORR DIVISION
570 LEXINGTON AVE., NEW YORK 22, N.Y.

Early Spring Adds To Fire Hazard

The rapid disappearance of snow as a result of one of the earliest springs of record, and of weather hotter for this time of the year than any previously recorded, has greatly heightened the danger of forest fires. The Quebec Government has advanced the opening date for trout fishing by two weeks as compared with the average, and fish and game clubs throughout the province are repeating the warning given by the Canadian Forestry Association as to the greater fire hazards accompanying the early season. The Association's warning concludes with these words: "Dead forests fill no pay-envelopes, but they do establish great liabilities in disordered lakes and rivers, the riddance of fishing and hunting, and the expense of waiting a half or full century for a new forest to arise."

Peter T. Krogseng Dead

Peter T. Krogseng, 53, mayor of International Falls, Minnesota, and office manager for the Minnesota and Ontario Paper Company and its Insulite division there, died unexpectedly in his office on April 11.

A veteran of World War I, in which he served 22 months overseas with the 163rd Infantry, 41st division, Mr. Krogseng had been mayor of International Falls continuously since April 7, 1942. He joined Mando September 1, 1926, as a member of the auditing staff and held various positions until his promotion, this year, to office manager.

Mayor Krogseng was long active in Legion, church, scouting and lodge affairs. He was past commander of William A. Robideau Legion post and past master of Koochiching Lodge No. 270, A. F. & A. M.

Manchester Foundry Inc. Formed

The Improved Paper Machinery Corporation of Nashua, N. H. has purchased a gray iron, Ni-resist and bronze foundry at Manchester, N. H. and has organized a wholly owned subsidiary corporation under New Hampshire law, known as Manchester Foundry, Inc. William F. Griffin, former owner, will continue as President of the new corporation. The foundry is being modernized and new equipment is being installed as rapidly as conditions permit.

Another purchase by Improved is a tract of land of 26,000 square feet on which a modern woodworking and pattern making plant was in the process of being established. The Company plans to use the facilities of this plant for building all cypress vats and other equipment and to enlarge their facilities for pattern making.

WPB Appoints C. J. Dynes

WASHINGTON, D. C., April 18, 1945—Charles J. Dynes, of the Sorg Paper Company, of Middletown, Ohio, has been designated as chief of the Coarse Paper Branch of the Paper Division, the Forest Products Bureau of the War Production Board announced today.

Mr. Dynes succeeds Harold O. Nichols, who resigned as chief of the branch March 31, after sixteen months' service, to return to his former position as manager of the eastern division of the Crown-Zellerbach Company, of New York.

For the last year, Mr. Dynes has been in charge of the Paper Division's specialty and industrial papers.

To Be Asst. Sales Director

Fred W. Fraley, vice president-director of sales of Diamond Alkali Company, announces the appointment of William H. McConnell as an assistant director of sales. Mr. McConnell will be located in the Diamond Alkali Company's general offices, 2400 Oliver building, Pittsburgh, Pa.

Prior to his appointment, Mr. McConnell was vice president of the Benner Chemical Company, Chicago, distributors of Diamond Alkali products. Before joining the Benner Company, he was a member of the sales department of Diamond Alkali Company in Pittsburgh. He is a graduate of Pennsylvania State College, where he specialized in business administration and engineering.

WILLIAM H. MCCONNELL

Arthur V. Howland Back from South

BOSTON, Mass., April 16, 1945—Arthur V. Howland, vice-president and assistant treasurer of Tileston & Hollingsworth Company, has returned from a vacation in Raleigh, N. C., after a rest.

Lieutenant George Holbrook, U. S. Navy, salesman for Tileston & Hollingsworth Company, who has been in the South Pacific, is enjoying a 30-days furlough at his home in Randolph, Mass., and has visited the office of the company a number of times.

John Glover, salesman for Tileston & Hollingsworth Company, who suffered a fracture and severe dislocation while coasting February 1, has just returned to the office of his company.

L. W. Nystrom To Be Sales Manager

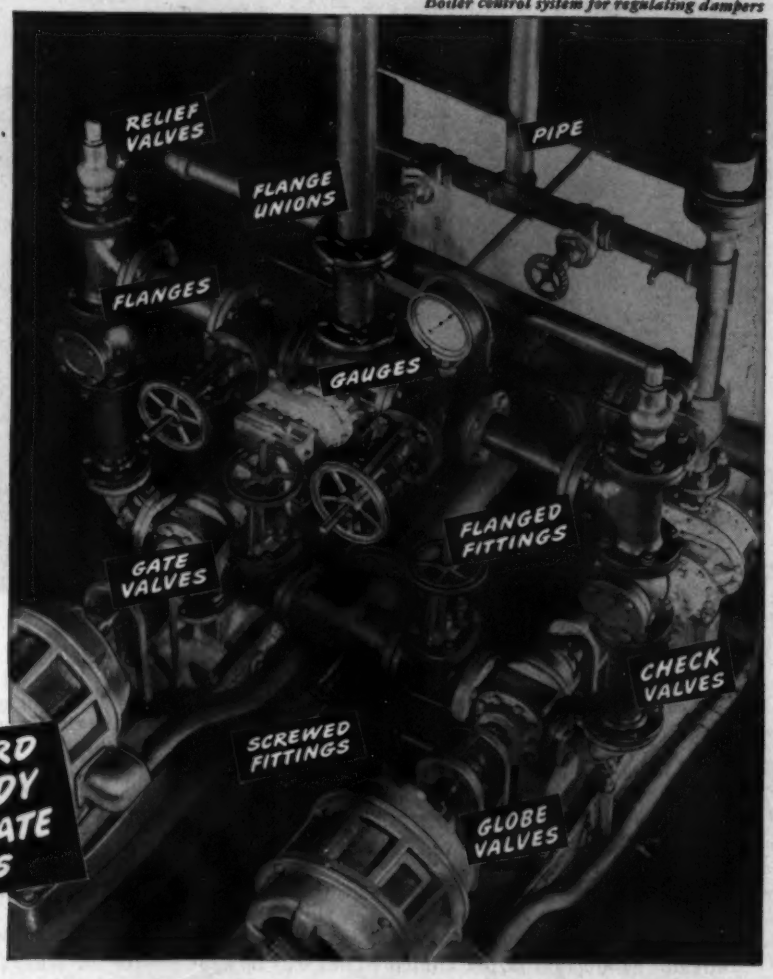
The appointment of L. W. Nystrom as sales manager of Blake, Moffitt & Towne, Inc., Tacoma, Wash. was recently announced by L. V. Hall, vice president of the company. In making the announcement, Mr. Hall said, "Roy Nystrom came to work for us on July 10, 1922. He worked in our stockroom and office learning the business until we felt he was qualified to represent the company as a salesman. He has served in this capacity up to the present time and we are particularly happy to make this announcement coming as a reward for his many years of faithful service."

DEPEND ON CRANE . . . WHEN IT'S PIPING EQUIPMENT YOU NEED

ONE SOURCE OF SUPPLY • ONE RESPONSIBILITY FOR ALL PARTS • ONE STANDARD OF QUALITY

To keep piping at its best, to simplify and speed up deferred replacements—call on the Crane line. You choose from the world's greatest selection of piping materials—in brass, iron and steel. One source—your Crane Branch or Wholesaler—supplies on one order all your requirements. Every part is uniform in quality, backed by a single responsibility. Your whole task from ordering of parts to installing them is simplified—and at the same time you are benefiting by Crane Co.'s 90-year leadership in the field of piping materials. Below is an example of Crane complete lines—in Standard Iron Body Wedge Gate Valves.

Boiler control system for regulating dampers



SERVICE RECOMMENDATIONS: **Crane Standard Iron Body Wedge Gate Valves with Brass trim are recommended for steam, water or oil lines; all-iron valves for oil, gas or fluids that corrode brass but not iron. Made in O.S.&Y. and Non-rising Stem patterns.**

Working Pressures

Size of Valve	Screwed or flanged end valves		Hub end valves
	Saturated Steam	Cold water, oil or gas, non-shock	Cold water or gas, non-shock
2 to 12 in.	125 pounds	200 pounds	200 pounds
14 & 16 in.	125 pounds	150 pounds	150 pounds
18 to 24 in.	*	150 pounds	150 pounds

*For steam lines larger than 16-in., Crane 150 pound Cast Steel Gate Valves are recommended. (For sizes under 2 in., use Crane Clamp Gate Valves.)

CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. • *Branches and Wholesalers Serving All Industrial Areas*

CRANE

90 YEARS OF PROGRESS

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

Paper Production for February

The following data cover all known mills and represent a continuation of the monthly statistics initiated in "Facts for Industry," series 24-2-1. For annual data and a description of the statistics, "Facts for Industry," series 24-1-2 should be consulted. All inquiries concerning these data should be addressed to the Bureau of Census, Washington 25, D. C.

Type of paper	1945 February	1945 January[1]	February[1] 1944
All types	1,324,431	1,443,310	1,379,638
Paper	639,446	696,984	668,657
Newsprint	58,285	60,386	54,118
Groundwood paper	48,408	52,147	47,861
Printing	18,095	19,562	18,260
Specialties	30,313	32,585	29,601
Book paper	108,972	120,042	121,755
General printing	79,654	90,374	84,384
Converting paper	29,174	29,426	37,050
Other book paper	144	242	321
Fine paper	77,556	85,670	76,612
Writing paper[2]	58,860	64,519	57,152
Cover and text	3,242	4,321	4,194
Reproduction	4,034	4,380	4,186
Bristols[3]	6,804	7,007	5,953
Thin paper	4,581	5,178	4,753
Other fine paper	35	265	374
Coarse wrapping, converting and bag paper	148,143	165,587	159,830
Wrapping paper	62,747	74,120	62,211
Glassine	6,069	6,623	7,051
Greaseproof	1,809	2,035	1,894
Vegetable parchment	2,642	2,578	2,638
Other wrapping paper	52,227	62,884	50,628
Bag paper	26,631	32,048	35,248
Converting paper	58,765	59,419	62,371
Multi-wall sack paper	29,649	31,576	29,745
Special industrial paper	19,475	18,419	19,267
Sanitary paper	64,798	70,299	64,902
Tissue paper	11,477	12,692	12,908
Absorbent paper	6,742	7,489	7,243
Building paper	65,941	72,677	74,416
Paperboard	684,985	746,326	710,981
Container board	322,472	345,857	330,301
Folding boxboard	165,882	185,151	165,148
Set-up boxboard	52,209	59,302	56,774
Cardboard	5,431	5,827	6,102
Building board	82,047	88,006	88,397
Miscellaneous board	56,944	62,183	64,259
Tube stock	37,993	41,095	43,284

[1] Revised.
[2] Includes Drawing, mechanical and detail and Protective and check.
[3] Includes Government postal card stock.

Newsprint Production Increases

Production of newsprint in Canada during March 1945 amounted to 263,776 tons and shipments to 267,163 tons, according to the News Print Service Bureau. Production in the United States was 64,733 tons and shipments 66,166 tons. The output in Newfoundland was 27,112 tons and shipments were 21,402 tons making a total North American production of 355,621 tons and shipments of 354,731 tons. Total production in March 1944 was 332,161 tons and shipments were 315,337 tons.

The Canadian mills produced 33,448 tons more in the first three months of 1945 than in the first three months of 1944, which was an increase of 4.6 percent. The output in the United States was 7,935 tons or 4.5 percent more than in the first three months of 1944; in Newfoundland production was 18,358 tons or 29.9 percent more, making a total increase of 59,741 tons, or 6.1 percent more than in the first three months of 1944.

Stocks of news print paper at the end of March were 108,281 tons at Canadian mills, 5,318 tons at United States mills, and 55,391 tons at Newfoundland mills, making a combined total of 168,990 tons compared with 168,100 tons on February 28, 1945, and 190,856 tons at the end of March 1944.

Sgt. Harris Killed in Action

A. S. Harris, president of Harris-Seybold-Potter Company has been notified by the War Department that his older son, S/Sgt. Alfred Stull Harris, Jr., 27 years of age, was killed on Luzon on February 4.

After attending Miami University and Kenyon College, Sgt. Harris was employed at the Harris plant at Cleveland. On March 1, 1941, he enlisted in a Cleveland unit of the Ohio National Guard. Many of his boyhood friends and associates were with him

Sgt. A. S. Harris, Jr.

in this outfit. He went overseas to New Guinea with a replacement group in September of 1944. He took part in the campaign on Leyte, and moved on for the invasion of Luzon and the subsequent capture of Manila.

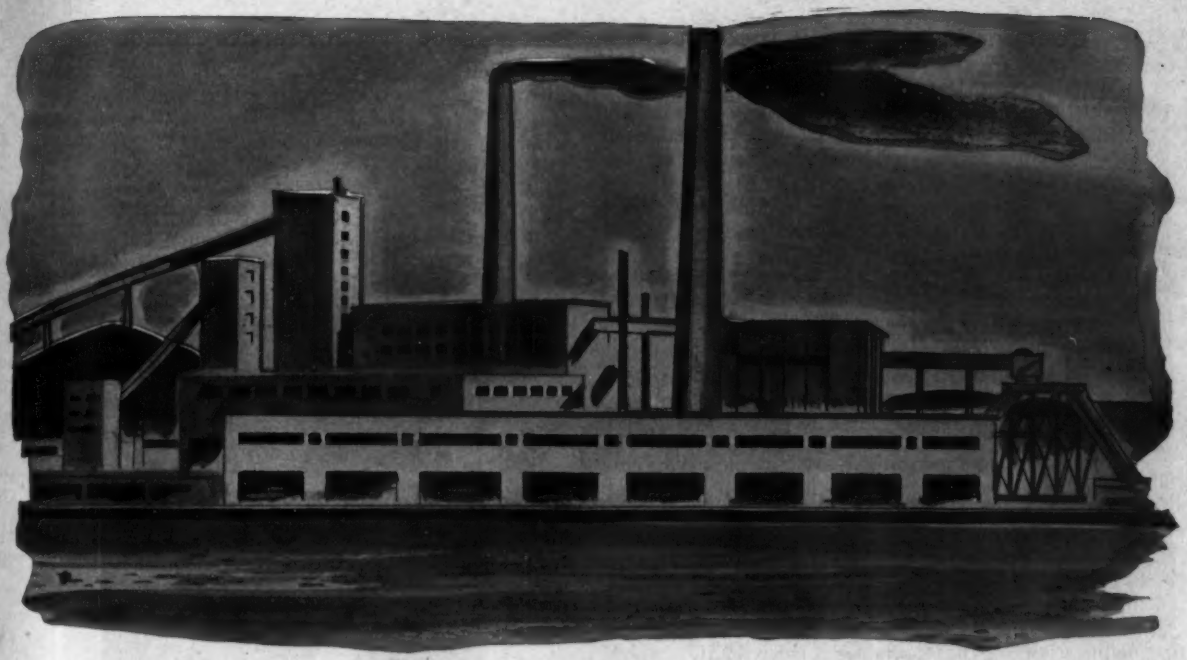
Sgt. Harris was the grandson of the late A. F. Harris, one of the founders of the Harris Company and Chairman of the Board of the Company at the time of his death in June of 1943.

Sgt. Harris is survived by his father and mother, Mr. and Mrs. A. S. Harris; a sister, Mrs. Roger Williams—whose husband is in the South Pacific with the Navy; his brother Charles; also Sandra and David Williams, his niece and nephew.

Sandy Hill Wet Machine

A wet machine with a paper making vat is described in a folder just issued by The Sandy Hill Iron and Brass Works, Hudson Falls, N. Y. It is suitable for the manufacture of high quality electric and insulation boards, binders board, shoe, trunk and leather board, to fine specifications.

An alternate to the standard paperboard vat is offered by the movable cylinder mould vat. This attachment enables the cylinder mould to be moved in relation to the circle 3-inches in any direction from a central setting. This controls the flow of stock to a finer degree and gives control over formation of the sheet equivalent to rebuilding an ordinary vat in order to change the circle. The couch roll is provided with antifriction bearings. Scofield venturi suction boxes and felt conditioners are provided and a whipper can also be supplied if desired.



WHAT GOES ON IN THIS PAPER MILL...

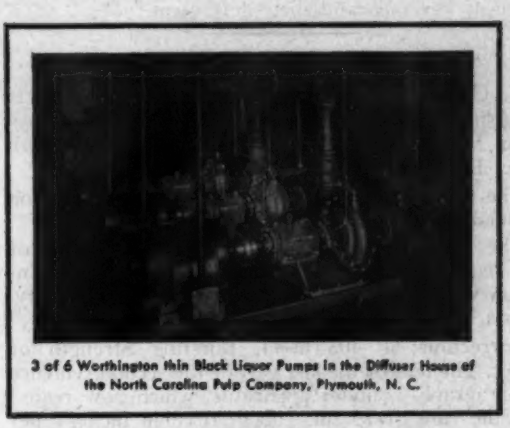
in addition to making paper?

Many paper mills today are *also* turning out chemical by-products of wood . . . such as tall oil, alcohol, resins, turpentine used in the manufacture of soaps, plastics, paints — to name a few. What new kinds of by-products will be made in paper mills of the future can't be said for sure right now.

What *is* certain is that the processing of chemical by-products calls for the right pumps — often specially-developed pumps — such as Worthington builds now . . . and *will* engineer to solve your future problems.

Worthington P.A.E.'s* offer the most in experience and know-how of pump application for all types of pulp and process problems. Worthington offers all types and sizes of centrifugal pumps to *overcome* these corrosion, abrasion, heat viscosity and solidification problems. If you need the right pumps now . . . or will need them after the war, you'll learn that *there's more worth in Worthington* by phoning our nearest office or writing to— *Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.*

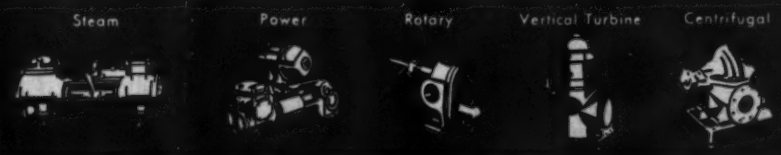
*P.A.E.—Pump Application Engineer.



3 of 6 Worthington thin Black Liquor Pumps in the Diffuser House of the North Carolina Pulp Company, Plymouth, N. C.

WORTHINGTON

THE WORLD'S LARGEST MANUFACTURER OF PUMPS



Containerboard Output Increased

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., April 18, 1945—The required production of containerboard for "V" boxes during April is 115,741 tons, which must be increased in May and June to meet military requirements for the second quarter, a joint meeting of the Containerboard and Fiberbox Industry Advisory Committees was told recently in Washington, the War Production Board reported today.

Tonnage of "V" boxes produced for the military services, and sent overseas at the rate of about 100,000 tons per month, is not expected to decrease greatly on "Victory-in-Europe" Day, WPB officials said. It may be possible that military requirements will be increased, officials reported. The "V" boxes were reported to be standing up well in use in the military zones.

The question of relaxing Naval packaging specifications was discussed, and officials of the Office of Price Administration and WPB agreed to look into the matter of quality and strength of domestic grades of board used in Navy clothing boxes and small stores boxes. Industry members stated that Navy specifications should be met.

The committees unanimously opposed a proposed modification of the Container Order L-317, which would offer a bonus of additional quota of reused boxes to users who secured and reused containers and sold the surplus for scrap, on the grounds that it was not practical and might disrupt the waste paper market and inspire a black market.

Current labor problems were discussed and officials outlined the local procedure of establishing the importance of key men and their deferment.

TAPPI Notes

C. C. Fisher, formerly of the Hawley Products Company is now consulting engineer for the Raytheon Manufacturing Company, 1065 Commonwealth Ave., Boston, Mass.

The meeting of the New England TAPPI Section planned for April 20 has been cancelled.

The Agricultural Cellulose Residue Committee of the Technical Association of the Pulp and Paper Industry will meet at the Northern Regional Laboratory, Peoria, Ill., on April 25-26, 1945.

Correction: T 403 m-44, Bursting Strength of Paper. The text of the last part of the second sentence in paragraph 3, under apparatus, which now reads: "At the rate of 75 ml. (about 6 cubic inches) per minute" should be changed to read: "At the rate of 90 ± 10 ml. per minute."

W. S. Bacon Becomes Chairman

NEW BRITAIN, Conn., April 16, 1945—Directors of American Paper Goods Company have voted a series of promotions in the executive setup. W. S. Bacon was advanced from president to chairman of the board, a newly created position.

Other changes include E. S. Lancaster, vice-president and treasurer, to president; C. O. Edgerly, Chicago manager, to vice-president, and W. F. Doran, assistant treasurer and assistant secretary, to treasurer.

The board also voted to pay a regular quarterly dividend of 60 cents a share, payable May 1 to stockholders of record April 20.

Goes With Francis Chilson

Wesley S. Corbin who was recently assistant director of mechanical development for the Scott Paper Company is now associated with Francis Chilson, industrial consultant, with offices at 101 W. 31st street, New York City.

Mr. Corbin went with the Scott Paper Company of Chester, Pa. as an engineering trainee directly following his graduation from Cornell University in 1931. He has been instrumental in the development of several new machines now being built on a commercial basis for the continuous rewinding, wrapping and packaging of tissues and towels. His work at Scott involved all phases of paper making, from the wood's operation through the pulp mills, paper mills and converting mills, to the finished product.

WESLEY S. CORBIN

In the years immediately before the war, Scott Paper organized a finishing development department and called in Francis Chilson for consultation as an expert in the packaging field of the drug, cosmetic and food industries. The entire packaging problem of the Scott Paper Company was analyzed, revamped and a new program worked out. Many phases of the program involved the use of standard equipment from other fields. Other phases called for the complete development of equipment that did not exist.

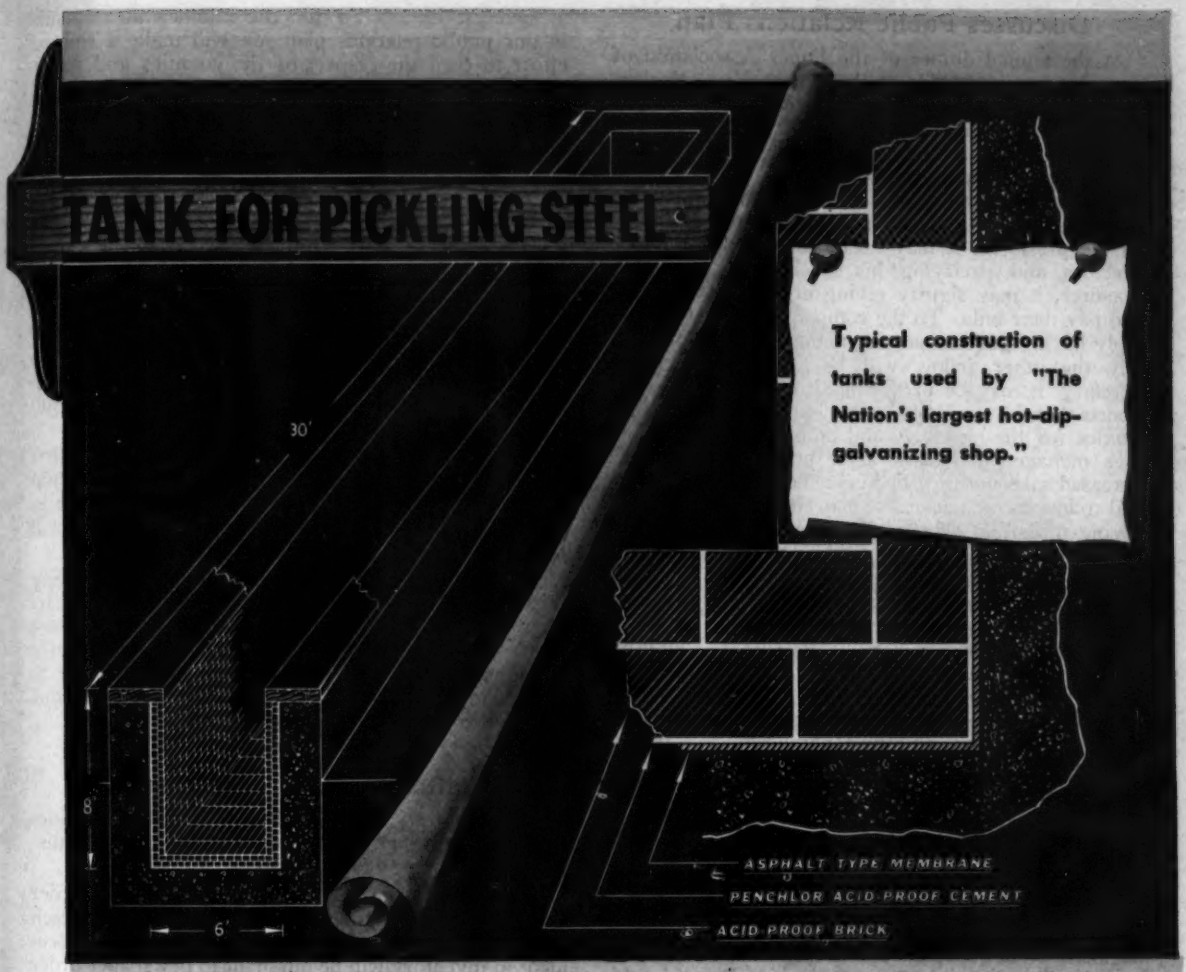
In association with Francis Chilson, Corbin will specialize in the paper and packaging field.

Westminster To Build Offices

Marking a further stage in the one million dollar expansion plans of the Westminster Paper Company Limited, the firm has now taken over the site occupied by the Fraser River Pile Driving Company, immediately west of the present paper plant.

The company is also taking over two one-acre lots, located across Fifth avenue on property which the city of New Westminster recently acquired from the Dominion Department of Indian Affairs. These two lots have been purchased for $3,500, and will be used as the site for the administrative offices of the firm.

Application has been made by the company for the closing of the street end at the foot of Eighteenth street, New Westminster, between Fifth avenue and the river bank.



When steel plates are pickled, prior to galvanizing, in 10% sulphuric acid at 180° F., corrosive action is severe. The tank shown above is lined with a double course acid-brick, laid entirely with Penchlor Acid-Proof Cement, which gives corrosion protection and also withstands the physical abuse resulting from submerging and withdrawing steel plates in this solution.

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Reg. U. S. Pat. Off.

Acid-Proof Cement

. . . sets quickly, reducing construction delays. It is a self-hardening sodium silicate type cement and has exceptionally long life, as proved in hard service and under severe acid conditions. It is unaffected by *all acids*—hot or cold—dilute or concentrated—except hydrofluoric acid.

Penchlor Acid-Proof Cement, used as a mortar, adheres strongly to brick, steel, glass, lead, rubber, and asphalt. Write today for further information.

OUR LONG EXPERIENCE WITH CORROSION PROBLEMS QUALIFIES US TO OFFER OUR RECOMMENDATIONS IN A WIDE VARIETY OF CONSTRUCTIONS. WRITE US ABOUT YOUR PROBLEM—NO OBLIGATION!

SPECIAL CHEMICALS DIVISION PRODUCTS

Acid, Alkali, and Solvent proof Cements • Lead Fluoborate Concentrates • Fluoboric acid • Acid, Alkali and Solvent Emulsion Type Cleaners • Paint Strippers • Pickling agents.

Special Chemicals Division

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Chemicals

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SPECIAL CHEMICALS DIVISION
PENNSYLVANIA SALT MANUFACTURING COMPANY
Dept. PTJ, 1000 Widener Bldg., Philadelphia 7, Pa.

I would like to have a free copy of your booklet No. 6 on Penchlor Acid-Proof Cement.

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

Discusses Public Relations Plan

At the annual dinner of the Paper Association of New York City, held at the Hotel New Yorker, New York, April 18, Col. Frank R. Schell, public relations consultant to the American Paper and Pulp Association was a featured speaker. Col. Schell's address, in part, was as follows:—

The term public relations like the expression freedom of enterprise is subject to many interpretations. To the president, it may mean selling his board of directors and pacifying his stockholders. To the treasurer, it may signify giving credit only to those who pay their bills. To the company attorney, it may imply having government regulations changed so that only the other fellow will be regulated. To the secretary, it may be preparing quarterly and annual reports that the stockholders will approve and securing proxies for the quarterly and annual meetings. The sales manager may look at it purely in terms of increased sales and satisfied customers. To the industrial relations manager, it may be connected with staving off union demands and pacifying labor. To the superintendent, it may be hiring and firing and supervising foremen.

So to make certain that we are talking the same language, let me give you my definition. To my mind public relations means simply the art of winning public good will. And by "public" I mean employees, directors, stockholders, managers, customers, union officials, citizens of communities in which a company or industry operates, and the general public. A public relations plan, therefore, is merely the modus operandi adopted to win public good will.

Charity begins at home. So does public relations. In this case, home is our business: our paper and pulp mills; our merchants and distributors; our retailers; our exporters and importers; our printers and publishers; in fact, everyone from the man who cuts down the tree to the man who sells the book, magazine or newspaper. We are all members of the same family and live in the same home. So we should all unite to make that home one that everyone will respect and admire.

So for our number one plank, we will create peace and good will in our own home. Our managers will stop trying to exploit our employees; our laborers will no longer try to chisel the last cent or concession from management, but will regulate their demands on what is just and reasonable. Our directors and stockholders will cease prodding management to squeeze the last cent of profit from the business. In other words, we will make boosters not knockers out of our stockholders, managers, employees and customers.

The first place where a family wins good or ill will is in the community where it lives. The same thing is true of a business or an industry. What makes a family popular in a town is what makes a business or industry popular: peace and harmony in the home; happy and contented members of the family; attractiveness of the family's house and grounds; a sincere and unselfish interest in civic affairs; generous hospitality; unostentatous liberality.

So for the number two plank in our public relations plan, we will so order our conduct that we will win the good will of the communities in which our respective businesses—which means our industry—is located.

If our family is universally respected and admired in our respective communities, we will discover, ere long, that our counties and states are beginning to take an interest in us. So for the number three plank in our public relations plan, we will make a sincere effort to earn the respect of the counties and states where our industry is located.

The ripples in the pond that we have made in our communities, counties, and states, awake us one morning to tell us that our reputation has jumped state boundaries; and that our country has begun to recognize our worth. So for the number four plank in our public relations plan, we will cultivate national good will by every means in our power.

But no plan is worth the paper on which it is written unless all members of our family make a real effort to carry it out. One black sheep can ruin an entire family. So for the number five plank in our public relations plan, we will see to it that all members of the family shoot at the same target. This is a job for a high-powered rifle, not a shotgun.

This, in a nutshell, is the public relations plan that I have recommended to the American Paper and Pulp Association. If all members of the industry unite in putting it into effect, it will succeed; otherwise, it will fail.

This association can help tremendously in making this plan a real vital force in American industrial life. You are far better judges than I am of how best you can do it. I suggest that your president refer this question to your public relations committee to determine how you can best participate in what I hope will be the joint action of the entire industry.

Tightens Control of Newsprint

WASHINGTON, April 17, 1945—The War Production Board today tightened its control over the distribution and use of newsprint.

Under an amendment to general conservation order M 241, a certification is now required with each purchase of newsprint, stating that its use or placement in inventory will be pursuant to newspaper order L 24 or the other printing and publishing limitation orders.

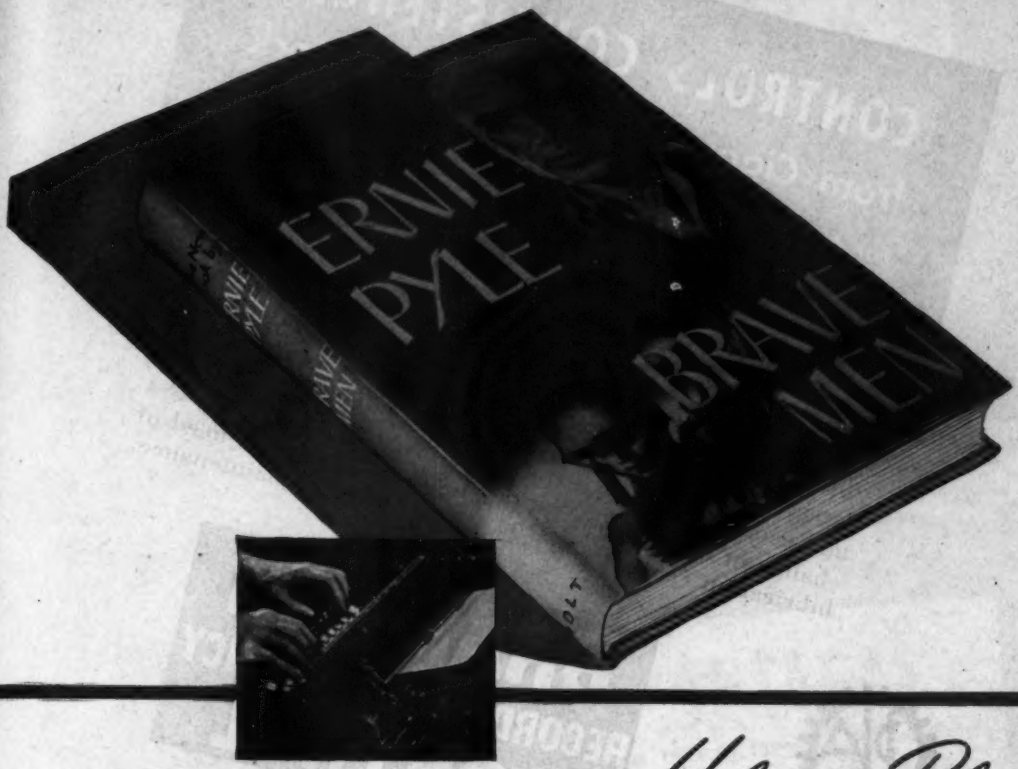
The new certification must contain a breakdown of the delivery order stating the paper tonnage used under the particular WPB order. Manufacturers, merchants and other persons are not permitted to fill an order without this information. This was intended for users of newsprint who buy directly from paper mills.

The House Newsprint Investigating Committee said today that it was working on a policy to increase paper and pulp imports after V-E day and to cut back exports of these products. Lyle H. Boren, Democrat, of Oklahoma, chairman of the committee, said that it was possible that immediately after V-E day the foreign supply of paper and pulp to this country will be increased.

Bowling Congress Honors Brookes

B. C. (Bert) Brookes, assistant to the director of purchases at Minnesota & Ontario Paper Company, has been named a member of the New Equipment committee of the American Bowling Congress. The committee makes no purchases, but exercises direct supervision on the game through approval of equipment used in allevs. Mr. Brookes, a bowling enthusiast for more than 30 years, was elected executive director of the ABC in 1942.

THE BEST SELLER STARTS ON WHITE PAPER...



...AND WHITENESS STARTS WITH *Helmerco Blue!*

Today's white bond, writing, book and ledger papers possess a high whiteness of shade that yesterday's papers never knew, when they're tinted to a pure white perfection with Helmerco Blues.

Helmerco Blues have excellent working properties in any furnish. Added directly to the beater, they disperse immediately, giving a broad range of white shades having good light fastness and excellent brightness. Helmerco Blues give white papers premium quality whiteness, at a minimum color cost. Fine light blues in the same group of papers can also be produced with Helmerco Blues.

H & M Technical Service Department is always ready to cooperate with you in developing special dyes for specific paper problems, or in supplying desired information on the correct usage of H & M colors.

RANGE OF HELMERCO BLUE SHADES FROM RED TO GREEN

M 4 R Conc.	2 G B Conc.
M 2 R W Conc.	M 2 G Conc.
M G W Conc.	M 4 G Conc.
M G Conc.	M 5 G

COLORS BY CALCO

Heller & Merz Department

CALCO CHEMICAL DIVISION • AMERICAN CYANAMID COMPANY

Bound Brook, New Jersey

New York • Chicago • Philadelphia • Boston • Charlotte • Providence

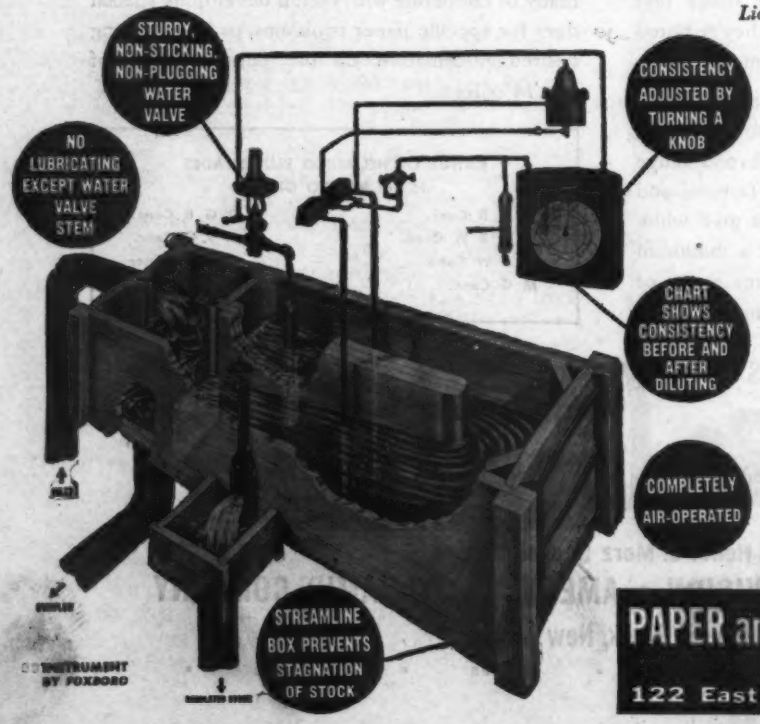
CONTROLS CONSISTENCIES from Cigarette Stock to Rag Stock

For Accurate Regulation of Consistency and Recording Both Before and After Diluting Water Has Been Supplied

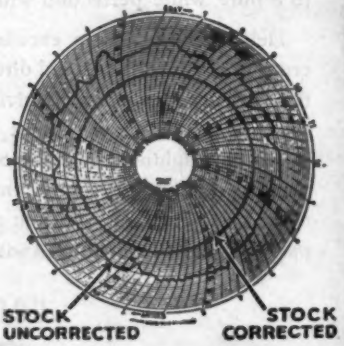
Affords the most accurate and dependable control and recording of consistency regulation of pulps, paper stocks, and viscous liquids. Successfully handles regulation of difficult stocks such as "lumpy" rag and free sulphite. Design is simple and unique . . . with important operating and economy features. Responds instantly to the slightest change in consistency. No moving parts eliminate need of lubrication (except control valve stem), and maintenance.

BRAMMER RECORDING CONSISTENCY CONTROL

PIA INC.


STURDY, NON-STICKING, NON-PLUGGING WATER VALVE
NO LUBRICATING EXCEPT WATER VALVE STEM
CONSISTENCY ADJUSTED BY TURNING A KNOB
CHART SHOWS CONSISTENCY BEFORE AND AFTER DILUTING
COMPLETELY AIR-OPERATED
STREAMLINE BOX PREVENTS STAGNATION OF STOCK
INSTRUMENT BY FOXBORO

Licensed under U. S. Patent Numbers: 1,810,111—1,884,075—2,302,326—2,302,327

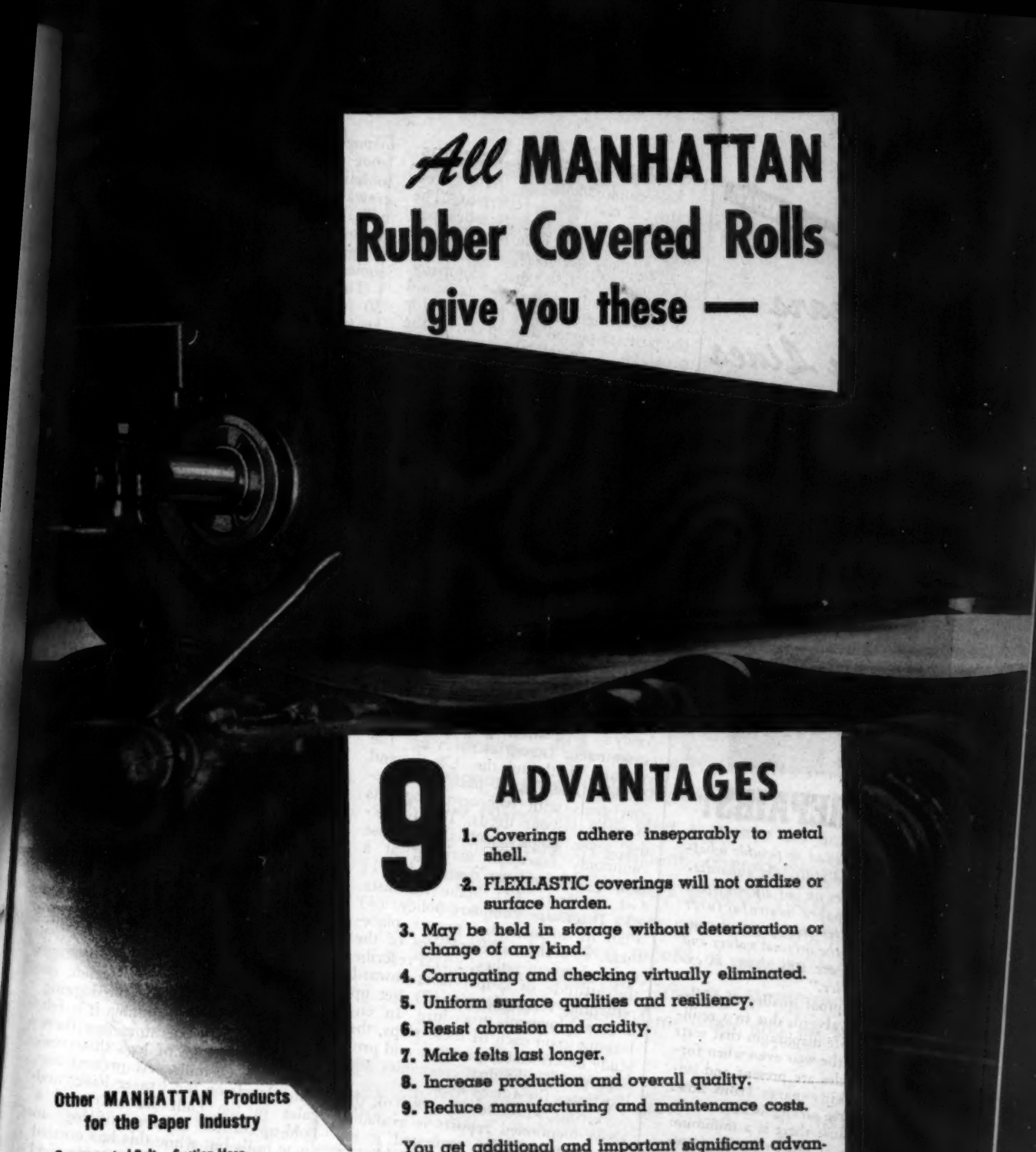


24-hour record chart, showing consistency before and after diluting water has been supplied

Write for Brammer Catalog

PAPER and INDUSTRIAL APPLIANCES
Incorporated
122 East 42nd Street, New York, N. Y.

All MANHATTAN Rubber Covered Rolls give you these —



9 ADVANTAGES

1. Coverings adhere inseparably to metal shell.
2. FLEXLASTIC coverings will not oxidize or surface harden.
3. May be held in storage without deterioration or change of any kind.
4. Corrugating and checking virtually eliminated.
5. Uniform surface qualities and resiliency.
6. Resist abrasion and acidity.
7. Make felts last longer.
8. Increase production and overall quality.
9. Reduce manufacturing and maintenance costs.

You get additional and important significant advantages in specific types of MANHATTAN Rubber Covered Rolls—like Couch rolls with sealed ends; suction press and extractor rolls; Rub-Roc water repellent Top Press and Marblex Table Rolls that eliminate galvanic action and do not carry surface water.

MANHATTAN Red Rubber Couch Rolls—"Sealed Ends" prevent rubber cover becoming loose or flared at roll ends.

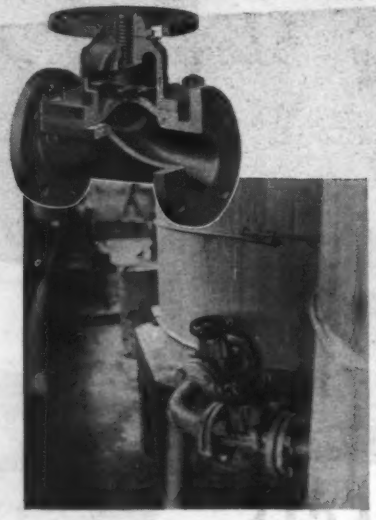
Other MANHATTAN Products for the Paper Industry

- Compensated Belt
- Conveyor and Elevator Belt
- V-Belt
- Agricultural Belt
- Air Hose
- Acid Hose
- Fire Hose
- Steam Hose
- Suction Hose
- Water Hose
- Paper Mill Hose
- Molded Rubber Goods
- Oilless Bearings
- Screen Diaphragms
- Rubber Covered Rolls
- Printing Ink Rollers

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.
PASSAIC, NEW JERSEY

can your valves match this?

four years on Alum Lines



No REPAIRS!

"WE HAVE had no trouble whatever with the Hills-McCanna diaphragm valves on our alum system lines," a paper manufacturer writes. "After four years of continuous use the original valves and diaphragms are still giving us excellent service."

The leakproof quality of Hills-McCanna valves is due to a resilient, long-life diaphragm that seats tightly on the weir even when foreign particles are present and isolates working parts from flow. Trouble-free service is further assured because there is a minimum restriction of flow, no wire drawing to worry about and no packing to replace.

For stock lines, black liquor, alum, air, water, bleach lines, etc. Pressures to 150 P.S.I. Sizes ½" to 14". Screwed or flanged connections.

Send for a copy of catalog V-44 which illustrates and explains Hills-McCanna Diaphragm Valves.

HILLS-McCANNA COMPANY
2447 W. Nelson Street, Chicago 18, Ill.

HILLS-McCANNA
SAUNDERS PATENT
Diaphragm VALVES

Re-employment of Veterans

"Re-employment of War Veterans," a companion report to "The Employment of the Handicapped Veteran," has just been issued by the Policyholders Service Bureau, Metropolitan Life Insurance Company. This new study is intended as an aid to management in its planning for the postwar period to help clarify the problem of re-employing returning veterans.

The study reports that the re-employment provisions of the Selective Service Act are already a minimum program rather than a maximum in many companies. This is particularly true of those companies anticipating little difficulty, with proper planning, in providing employment for servicemen. Quoting a number of the provisions of Section 8 of the Selective Training and Service Act of 1940, as amended to December 8, 1944, the report offers a list of questions related to the interpretation and application of such provisions, the answers to which should help in formulating company policy.

Of special interest are sections on demobilization plans, the U. S. Army's separation procedure, and Government agencies serving the veterans, both in the U. S. and Canada. The greater part of the report deals with company programs to meet postwar needs. The following seven steps specified as those commonly taken in arriving at a proper solution are discussed: (1) Get the facts, (2) Make forecasts, (3) Determine company policy, (4) Plan in advance for proper placement, (5) Inform employees of the re-employment policy, (6) Prescribe the attitude of Supervisors toward returning veterans, and (7) Set up a re-employment procedure. In enlarging upon each of these steps, the study describes the practices and procedures of individual companies and illustrates the forms used.

A copy of either or both of the above-mentioned reports is available to executives who requested it on their business stationery. Address: Policyholders Service Bureau, Metropolitan Life Insurance Company, 1 Madison avenue, New York 10, N. Y.

A Modern Mill Cafeteria

One of the most modern industrial cafeterias to be established in Western Canada was recently opened by the Powell River Company at its plant at the pulp and paper town of Powell River, B. C.

This new cafeteria was established following collaboration between the management of the company and the labor committees who were anxious to have hot meals provided for all crews working in the pulp and paper mill. After much consideration and discussion, the new cafeteria was designed and erected at a cost of some $25,000.

The dining room is very spacious, 30 feet by 70 feet and can sit 208 at one sitting. The serving runs along one side of the dining room and with the steam serving tables is 40 feet long. The kitchen is provided with oil burning ranges, steam stock pots, steam dish-washing machine, steam bain-marie, three compartment cold storage and all the usual equipment in such a unit. The dining room has a full glass front looking onto the street and is lighted with tubular lighting. The tables are made to accommodate eight diners, the seats being constructed with the table in one unit. A staff of 14 carries on the work of the kitchen and serving. A novel feature of the set-up is that to ensure cheaper meals for the employees every unnecessary cost has been eliminated and the diners are asked to pick up their trays and dishes on leaving, and carry same to the dish-washing wicket, thus saving considerable floor service. The cafeteria is managed by H. A. Florence, while Miss G. Gattenmeyer is responsible for direct supervision, being a trained dietician.

A committee composed of the management of the mill and representatives of the two labor unions, meet periodically to discuss the progress and are in the nature of an advisory committee.

Shortage of Logs

Due to the continuing decline in manpower available for the logging industry in British Columbia it is felt by some leading operators that there will be a shortage of logs this summer in B. C. mills. At present low water levels on the Fraser River and gales in the Gulf have created a hold-up in the delivery of logs to some mills but while this has created the timber shortage operators feel that the real shortage will come as the labor problem becomes more acute.

While the operators appreciate the work which has been done by National Selective Service in moving men into the woods as rapidly as they are available at the same time it is pointed out that prairie and eastern workmen in the industry have been returned to their own areas while trained keymen in high physical condition have been called up for army service.

More Optimism Prevails

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., April 16, 1945 —No improvement was seen last week in the local paper situation. The available supplies for civilian needs continued low and many orders are having to be turned away or only partly filled. Demand from those who hold priorities continued heavy.

Among the paper factories and makers of containers and boxes the situation was little changed, but there is a feeling slightly akin to optimism as the war in the European theater hastens to its conclusion. Lack of manpower has been the big bottleneck in these factories for months and it is felt that if Germany is beaten down there will be a decline in the number of workers inducted and also that some soldiers will be discharged and that plants can improve the manpower situation at least a trifle. The executives do not believe there will be any decline in priority orders for some time to come, even after the European theater becomes quiet, but they are hoping there will be so some of their civilian customers can get something near what they want.

Wrapping paper and bags continued to be in heavy demand even though the Easter season is over. The supplies last week were very light. A heavy demand also was reported for all sorts of cleaning tissues, with light supplies. The coming of warmer weather has caused some jobbers to speculate on the summer specialty situation. At the present time it looks none too good. Lack of gasoline and tires may curtail to some extent the demand for these items, but if they are curtailed, it will suit the jobbers, for there are only limited supplies.

Demand for building paper and roofing already has begun and likely will be heavier than last year. Jobbers have fair stocks, but they will not care for a much larger demand than that of last year.

Paper stock continued in big demand, with all grades being wanted. Collections here have been good, but mill demand has been so heavy that little remains in the warehouses. Ceiling prices prevail both in paper and rags.

Cellophane in the War

Military and other war demands for cellophane reached a new high during March, E. I. du Pont de Nemours & Company disclosed today.

One of the latest military uses of the transparent film is a protective package for propellant powder used in 60-mm. and 81-mm. mortars. Each shell carries its own charge of high explosive, but it has to be sent to its objective by a charge of powder detonated at the base of the mortar. This is accomplished by attaching packets of powder to the "fins" of the shell. An ordinary shotgun type shell detonates the propellant charge.

It was found difficult to keep the propellant powder dry in the field until the Ordnance Department worked out a method of packaging it in moistureproof cellophane, heat-sealed at all edges.

Current operations in Germany and the Pacific have called for increased use of the mortar and have brought heavy demands for mortar ammunition.

As a result of this new use and the sharply increased demand for other military purposes such as gas-protective covers for personnel, packaging of combat rations, medical products and ordnance parts, there will undoubtedly be a temporary reduction in the amount of cellophane-packaged food and tobacco products available to the public.

Specify CINCINNATI RUBBER COVERS for your SUCTION PRESS ROLLS

"How good" the service you receive from your suction press rolls, depends on "how good" the covers, so why take a chance on an item so important to efficient operation. Specify *Cincinnati* rubber covers whether you're buying a new suction press roll or re-covering an old one. The long record of success behind Cincinnati rubber roll covers is a strong recommendation. Specify *Cincinnati* and be sure.

THE CINCINNATI RUBBER MFG. CO., CINCINNATI, O.

Overseas Exports of Newsprint

In conformity with censorship regulations, it is now permitted to release the following figures in regard to Canadian exports of newsprint to overseas markets for the first nine months of 1944, as compared with the similar period for 1943. It will be noted that while the volume exported to the United States was well maintained, overseas exports showed a marked increase. The figures, compiled by the Newsprint Association of Canada, are as follows (in short tons):

	Nine Months 1944	1943
United Kingdom	35,013	19,729
Eire	1,300	3,186
Continental Europe	5,259	1,325
Mediterranean Area	3,195	2,757
Egypt	6,821	2,306
British South Africa	18,529	2,255
Other Africa	2,205	730
Br. India, Ceylon & Burma	18,234	7,940
Australia	56,012	12,194
New Zealand	13,226	16,372
Argentina	35,319	35,123
Brazil	33,217	32,062
Uruguay	10,077	8,884
Other South America	21,990	12,375
Mexico	11,719	5,098
Cuba	9,368	9,045
British West Indies	3,672	2,224
Other Caribbean Area	9,569	5,449
Others	6,816	5,727
	301,541	184,781
United States	1,780,023	1,891,516
Total	2,081,564	2,076,297

No Major Reconversion Problem

R. L. Weldon, president of the Bathurst Power and Paper Company, in an address before the Engineering Institute of Canada here, said that Canada's tremendous potential capacity to produce goods, developed in the war, might be a grave threat to the Dominion's internal stability unless there were understanding and proper collaboration between government and industry. As to the pulp and paper industry, he said that no major reconversion problem was involved. Pointing out that the maintenance and growth of this industry were of prime importance to the nation, he warned that unbridled, uneconomic expansion of facilities to produce pulp and paper would soon produce a surplus, as before the war. Towards finding the rate of expansion economically feasible, he urged the collection of statistics and information by qualified groups and increased research. He said the pulp and paper industry was the first in Canada to recognize the importance of a research organization which would act as a common center for a collective group of financially separate organizations adding that the Pulp and Paper Institute of Canada was unique in that its operation was a joint undertaking of the industry, the Dominion government and McGill University.

"From research, pure and applied, fundamental and industrial, will flow much of the ability of this industry to retain and develop the place which it has established for itself in the world," he said.

O. H. Clapp Returns from Brazil

Oliver H. Clapp, a vice-president of Stein, Hall & Co., Inc., New York, has returned from a four months' business trip to Brazil. Stein-Hall manufactures and distributes starches, gums, dextrines and other materials used by many industries and imports tapioca, burlap and other commodities.

Valves with ample strength

BEFORE it leaves the factory every Kennedy Valve must prove that it will withstand far more than its rated pressure, will seat tightly, release promptly, and operate dependably.

Whether you purchase a Kennedy, Gate, Globe, Angle or Check Valve for any pressure, you have the same security of generous safety factor in design, high grade metal in every part, and effective and time-proven operating mechanism.

Kennedy Valves and Pipe Fittings can be obtained from your local supply house.

THE KENNEDY VALVE MFG. CO. ELMIRA, N. Y.

KENNEDY

Extra Values in VALVES and PIPE FITTINGS

OWI Photo by Palmer in an Allegheny Ludlum plant

AMERICAN TREASURY... THIS YEAR'S STYLE

HAND BOOK OF SPECIAL STEELS

Newly revised and reprinted—a comprehensive book on the properties, uses, and best methods of handling, treatment, etc. of tool, stainless and other alloy steels. Plenty of tables to facilitate quick reference and selection. 136 pages, pocket-sized, latest data.

SEND FOR YOUR COPY

Address Dept. PT-32

THOSE slabs and billets of special high-alloy steels, awaiting further processing in Allegheny Ludlum plants, are raw materials for the world's finest mechanical equipment. They're also the main reason *why* it's the finest. Special steels give the extra performance—the superior electrical properties, or strength and toughness, or resistance to heat, wear and corrosion, as the case may be—that gives one product the edge over another.

That is true for combat equipment, and it's true for commercial products. Our principal high-alloy products are corrosion and heat-resisting, tool and die, electrical, valve and nitriding steels. Many of them we originated. Let us help you to fit them into your products and plans, and to handle them economically.

Allegheny Ludlum STEEL CORPORATION

BRACKENRIDGE, PENNSYLVANIA

W&D A-9338

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending April 14, 1945

STOCKS

	High	Low	Last
A. P. W.	4¾	4¾	4¾
Armstrong Cork Co.	45¾	43¾	45¾
Celotex Corp.	15⅞	15⅛	15¾
Celotex Corp., pf.	20¼	20	20
Certain-Teed Products Corp.	9	8	9
Certain-Teed Products Corp., pf.	149	145	149
Champion Paper & Fibre Co.	32	31	32
Champion Paper & Fibre Co., pf.	113	112	113
Congoleum-Nairn Co.	29¾	27⅞	29¾
Container Corp. of America	28	26⅛	28
Continental-Diamond Fibre Co.	11¼	10⅝	11¼
Crown-Zellerbach Co.	22½	21⅜	22¾
Crown-Zellerbach Co., pf.	104⅜	103⅜	104
Dixie Cup Co.	18⅛	17⅞	18⅛
Dixie Cup Co.—A	48½	48	48½
Flintkote Co.	27⅜	25½	27⅜
Flintkote Co., pf.	105¾	105¾	105¾
Robert Gair	5¾	5¼	5¾
Robert Gair, pf.	16¾	16⅜	16⅝
International Paper Co.	24⅛	22½	24
International Paper Co., pf.	90½	89¾	90½
Johns-Manville Corp.	115	109½	114¾
Johns-Manville Corp., pf.	...	...	...
Kimberly-Clark Corp.	43½	43⅛	43½
Mac Andrews & Forbes	...	...	...
Mac Andrews & Forbes, pf.	148	148	148
Masonite Corp.	43¾	41¾	42⅜
Mead Corp.	13	12¾	13
Mead Corp., pf. A—6%	105	105	105
Mead Corp., pf. B—5½%	96	95	96
National Container Corp.	15¾	15⅛	15¼
Paraffine Companies, Inc.	63¾	62	62
Paraffine Companies, Inc., pf.	...	...	...
Rayonier, Inc.	17⅜	16⅜	17⅜
Rayonier, Inc., pf.	36¼	36	36
Ruberoid Co.	35½	35	35½
Scott Paper Co.	46½	44¼	46½
Scott Paper Co., pf.	110	109¾	109¾
Sutherland Paper Co.	31½	31	31
Union Bag & Paper Corp.	16¾	15⅝	15¾
United Paperboard Co.	6⅛	6⅛	6¼
U. S. Gypsum Co.	86	82	86
U. S. Gypsum Co., pf.	191	190	191
West Virginia Pulp & Paper Co.	23½	23	23⅛
West Virginia Pulp & Paper Co., pf.	...	...	...

BONDS

Abitibi Pulp & Paper Co. 5s '53	102¾	101¾	102¾
Celotex Corp. 3½s '55	103	103	103
Certain-Teed Products Corp. 5½s '48	...	...	...
Champion Paper & Fibre Co. 4½s '50	...	...	...
International Paper Co. 6s '55	110	109¾	110
International Paper Co. 5s '47	104½	104¾	104½
Mead Corp. 3½s '53	...	...	...
West Virginia Pulp & Paper Co. 3s '54	...	...	...

New York Curb Exchange

High, Low and Last for Week Ending April 14, 1945

STOCKS

	High	Low	Last
Great Northern Paper Co.	...	...	...
Hummel-Ross Fibre Corp.	7¾	7½	7½
St. Regis Paper Co.	6⅛	5¾	6⅛
St. Regis Paper Co., pf.	...	...	...
Taggart Corp.	6	6	6

BONDS

American Writing Paper Co. 6s '61	...	...	...

Propose to Refund M. & O. Bonds

R. H. M. Robinson, president of Minnesota and Ontario Paper Company, has announced that the shareholders of the company, at their annual meeting to be held in Minneapolis on May 28, 1945, will be asked, in connection with a proposal to refund the balance of approximately $6,000,000 of the Company's 5% Income Bonds, to authorize a new mortgage and the issuance thereunder of $6,000,000 of new Mortgage Bonds bearing interest at approximately 3% per annum, with maturities extending over a period of fifteen years.

Mr. Robinson further stated that the proposed financing would reduce annual interest charges by approximately $120,000 and reduce annual bond retirements which have averaged $1,450,000 per annum for the preceding four years, to an average of $400,000 per annum over the next fifteen years.

Mr. Robinson emphasized that not only would the saving in interest be highly important but the moderate bond retirement obligation would make available funds for other corporate purposes essential to the welfare of the Company, particularly in respect to necessary improvements and expansion of properties and anticipated postwar requirements. He further stated that while the new mortgage will provide for the issuance of bonds up to a maximum of $10,000,000, it is not presently proposed to issue more than $6,000,000.

Mr. Robinson stated that the annual report respecting operations for the year 1944 which has been mailed to shareholders shows a net income of $1,125,287, or 83 cents per share after provision for income taxes, compared with $1,463,806, or $1.08 per share in 1943; and that net sales increased slightly, while cost of sales increased approximately $500,000, due chiefly to some shortages in raw materials, supplies and generally increased production costs.

Bathurst Co. Nets 95 Cents

MONTREAL, Que., April 16, 1945—Bathurst Power Company Ltd. reports 1944 net profit of $380,450 or 95 cents per "A" share, against $539,371 or $1.35 a share in 1943. Sales reached a new peak at $7,452,835 against $6,992,759.

The balance sheet as at the end of 1944 shows net working capital reduced $280,913 in the year from $4,664,466 to $4,383,553 with cash and securities down from $2,434,374 to $1,786,129. Reduction in working capital was due largely to capital expenditures for additions to properties during 1941 amounting to $754,899.

Overall production of Bathurst in 1944 showed a gain of 5,143 tons or 5% from 104,506 tons in 1943 to 109,649 tons. The chief gain was in kraft products (liner and corrugating board) into which the Company shifted its newsprint operations to accord with wartime demand. "Kraft" output rose from 49,575 tons or 47.4% of the total of 65,829 tons or 60%. Boxboard also increased from 19,678 to 20,542 tons, newsprint and miscellaneous specialties being down from 10,556 tons to 622 tons.

Total sales in 1944 amounted to 107,852 tons compared with 105,533 in the preceding year.

Eastern Tablets' Taxes Are Reduced

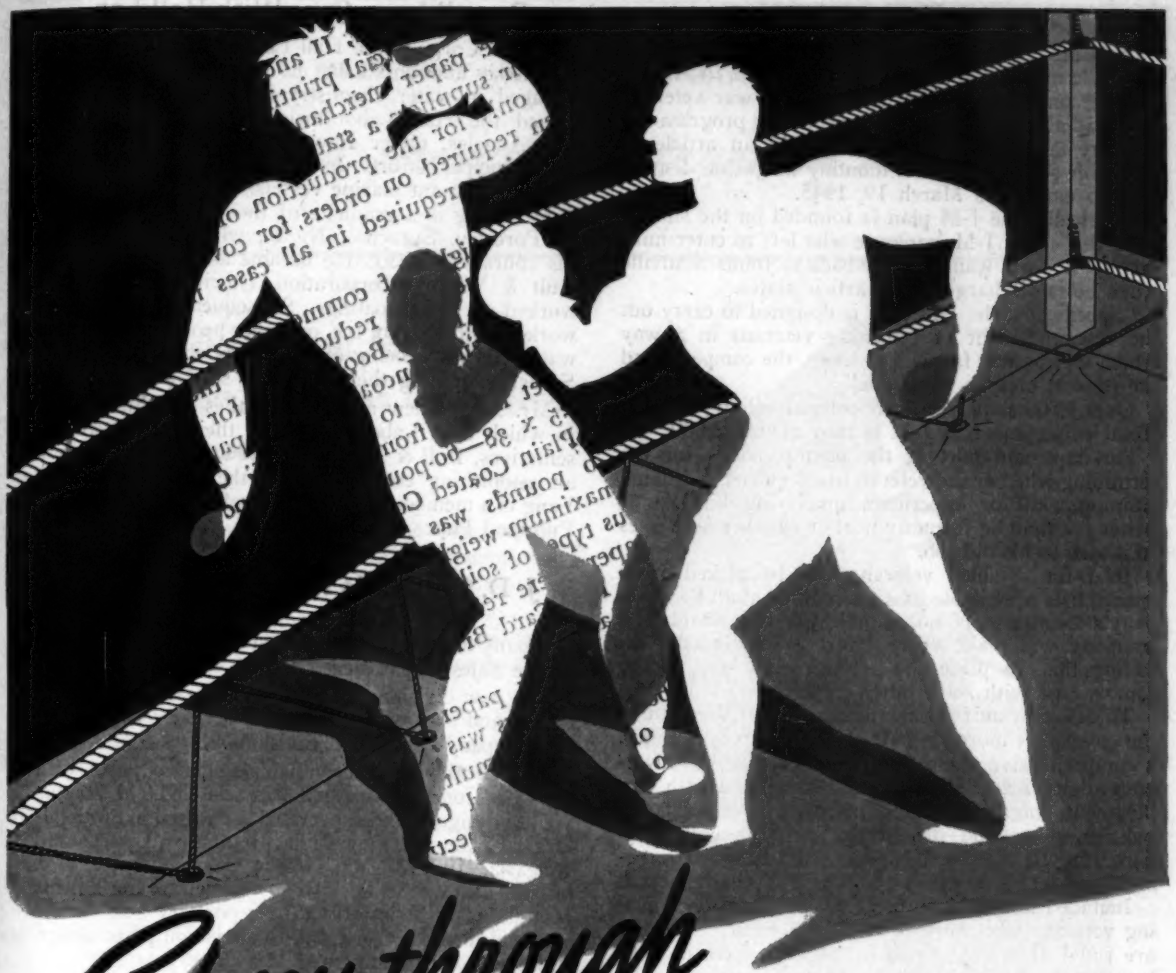
[FROM OUR REGULAR CORRESPONDENT]

ALBANY, N. Y., April 16, 1945—Announcement is made here that the local board of assessors has reduced the assessment of the Eastern Tablet Corporation from $225,000 to $217,000. The reduction followed a protest from the company alleging that the valuation was excessive. Operations at the plant are being carried on day and night but a shortage of help is hampering schedules to some extent. Orders are booked ahead for some time and the district is being combed for additional workers.

Lucius S. Howard to Be Chairman

At the annual directors' meeting of the Howard Paper Company held in Urbana, Ohio, March 12, 1945, a resolution was unanimously adopted paying tribute to Lucius S. Howard for his services to the Corporation over a period of thirty-six years.

In recognition of the services of Mr. Howard in behalf of the Company, he was given the honorary title of chairman. Mr. Howard has served as treasurer of the corporation since the date of its organization.



Show-through IS ON THE ROPES

Opacity, in the form of TITANOX, has really given show-through a thorough going over.

Paper manufacturers in increasing numbers have found in TITANOX pigments the answer to really adequate opacity in the lightweight stocks necessitated by present day restrictions. They have found that in addition to opacity TITANOX pigments give fine printing surface, extreme whiteness and brightness and that the strength of papers pigmented with TITANOX is in no way impaired.

It is safe to say that the important contribution of TITANOX in the solution of wartime paper making problems will result in much wider use of these fine pigments after the war.

We invite technical inquiry.

TITANIUM PIGMENT CORPORATION
SOLE SALES AGENT
111 Broadway, New York 6, N. Y.
104 South Michigan Ave., Chicago 3, Ill.
350 Townsend St., San Francisco 7, Cal.
2472 Enterprise St., Los Angeles 21, Cal.

TITANOX
REG. U. S. PAT. OFF.

Appoint Veteran Advisors

Appointment of veteran advisors at all Johns-Manville mines, plants and offices to assure individual and personal attention to all returning war veterans in the administration of a comprehensive program for their re-employment is announced in an article in J-M News Pictorial, semi-monthly magazine distributed to employees March 19, 1945.

"Basically, the J-M plan is founded on the sincere hope that every J-M employee who left to enter military service will want to come back to Johns-Manville when he is discharged," the article states.

"Specifically, the J-M plan is designed to carry out the re-employment of returning veterans in a way which will assure fairness to them, the company and the present civilian employee."

Over 4,500 employees have entered military service. Total employment in J-M is now about 13,000.

An important part of the plan provides for determining whether the veteran has acquired additional training, skill or experience qualifying him for a better job than he formerly held or whether he wishes to return to his old job.

Jobs for disabled veterans will be picked from special lists of suitable jobs maintained at all the company's locations. If no suitable job is available the company will make every effort to create one, or, failing this, to place the veteran elsewhere in the company or with some other employer.

To assist in uniform administration of the plan at the company's more than 70 offices, plants and mines, a comprehensive manual has been compiled for veteran advisors and other persons concerned with employment, containing statements of basic and detailed policies, plans and procedures, together with laws pertaining to veteran re-employment, data on government and J-M benefits for veterans and other material.

Included among J-M benefits extended to returning veterans who were former permanent employees are full J-M service credit for all time spent in military service; participation in group life insurance if service totals at least six months; participation in the retirement plan if service totals at least two years; and participation in group health and accident insurance and in vacation benefits if eligible.

Much of the plan, the article states, "stems from the contact which has been maintained between the company and service employees through letters, Christmas gifts, the sending of News Pictorial and Jobholder Reports and through the volumes of correspondence between individuals here in the company and employees who entered the Armed Services."

As a further step in the development of the veteran re-employment program, Lewis H. Brown, president, has written to former employees now in military service asking for general information with regard to personal desires, intentions and opinions which will be helpful to the company in its future relations with returning veterans.

In a statement of basic policy, Mr. Brown declares: "Nothing short of our most diligent, sympathetic and sincere efforts, can come close to paying a portion of the debt we owe to returning veterans. These men and women do not want empty promises and they are deserving of much better than this. We must leave no effort undone to assure a cordial welcoming hand to our own returning veterans and to provide them with the sympathetic counseling and assistance which will help them quickly to re-establish themselves in civilian careers."

Russell Lang Goes With Hall Lab.

Hagan Corporation, Hall Laboratories and Calgon, Inc. today announced that E. Russell Lang, formerly engaged in water chemistry in the paper field, has joined the Hall Laboratories field service staff at Los Angeles, under Ray Sullivan. He will devote his principal efforts to boiler water conditioning aboard merchant marine vessels.

Mr. Lang is a graduate of the New York College of Forestry, Syracuse, N. Y., where he completed his courses in 1936. He became associated with the Ault & Wiborg Corporation, Cincinnati, where he worked on paper coatings. Subsequently, in 1939, he worked with Calgon, Inc. on paper problems involving water, his work being carried on at the university in Syracuse, joining the Pittsburgh staff in 1943.

Mr. Lang's new assignment takes him into a field in which Hall Laboratories and their marine representatives, Bull & Roberts of New York, have made an astonishing contribution to the war effort. Mr. Lang is a member of the Technical Association of the Pulp and Paper Industry.

J. D. Grothe To Head Technical Div.

J. D. Grothe has been appointed by the Dorr Company to head its newly-created Technical Division of the Sales Department.

The new division co-ordinates contract engineering orders and serves in a technical advisory capacity to the company's field staff divisions.

Mr. Grothe previously held executive posts with the Dorr Company in London, Paris, and The Hague. He has designed and supervised construction of metallurgical plants in Yugoslavia, Roumania, Cyprus and Bulgaria. In 1937 Mr. Grothe was a member of a mission sent by the Turkish government to the Taurus Mountains in Asia Minor to report on gold, silver and lead deposits there, and to advise on plant design and operational techniques.

New Rotameter Catalog

A new publication on Rotameters issued by Cochrane Corporation of Philadelphia contains in addition to catalog material on the Cochrane line, helpful data on the selection of a Rotameter for any particular service. Specific gravities of gases and of various metals used in floats are given, together with formulae for converting water and air capacities to terms of other liquids and gases. Other selection factors, such as pressure drop, length of scale and float material are covered in this interesting publication, No. R-100A, a copy of which may be had by addressing Cochrane Corporation, Philadelphia, 32, Pa.

Steel Pressure Vessels

Steel and steel alloy pressure vessels, autoclaves and heavy plate work in large variety are the subjects presented in Bulletin No. 45 issued by the Biggs Boiler Works Company, Akron 5, Ohio.

The extensive plant facilities of the Biggs concern has created a large number of products and items of equipment used in many major industries. Among them are rotary digesters for cooking wood and other fibrous materials, mixing kettles in many types, storage tanks, welded steel pipe, and miscellaneous heavy steel plate work. The publication includes partial views of the concern's modern plant facilities.

YESTERDAY—A PIONEER INSTALLATION

Today—a proved construction material

Nickel-clad steel for large weld-free surfaces on high-speed fourdrinier inlet

Shortly before the war, the Valley Iron Works, Appleton, Wisconsin, built this stock entrance equipment of advanced design for a new high-speed fourdrinier in the South.

On the basis of accumulated experience and carefully observed tests, Nickel-Clad Steel was used for the inlet.

Strong, tough and corrosion-resistant, the Nickel-Clad offered the additional advantage of extra large plate size, which permitted the construction of an inlet with a minimum of welded joints.

Fiber and other stock components do not accumulate on the smooth Nickel-Clad Steel surface. A continuous, uniform and accurately calipered flow of Kraft stock, 17′ 6″ wide, moves through to the fourdrinier wire, traveling at speeds up to 1400 feet per minute.

The inlet design and the Nickel-Clad construction have proved their merits during 30 months of high-speed war production.

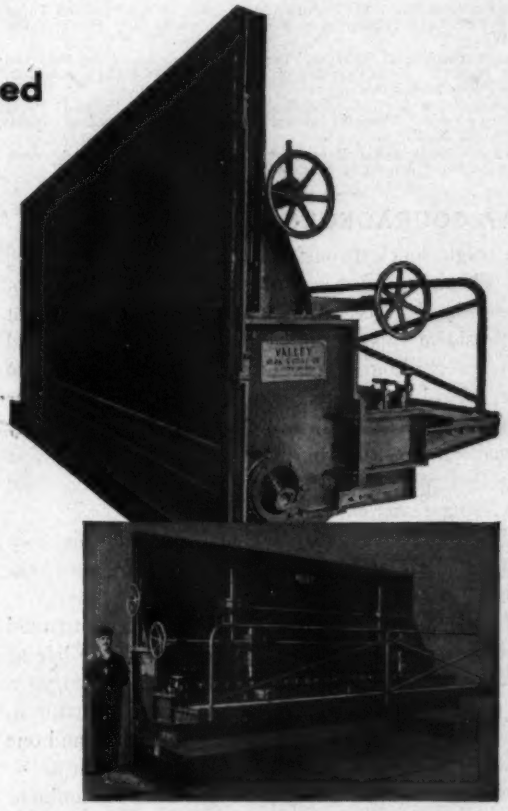
* * *

Nickel-Clad Steel, product of the Lukens Steel Co., has many properties that point to its widespread use in paper machinery of the future.

It consists of strong, rustless, corrosion-resisting nickel, extending to a depth of 10% or more of the total plate thickness, firmly bonded to steel. It has a minimum tensile strength of 55,000 lbs. and a modulus of elasticity of 30,000,000 lbs. per square inch.

Produced on the world's largest 206″ plate mill, Nickel-Clad Steel is rolled, for example, in ¼″ thickness up to 13 feet wide and 25 feet long in a single plate. Use of these large plates, as in the fourdrinier inlet, eliminates unnecessary weld joints, cuts down labor time and simplifies streamlined design.

Other pioneer Nickel-Clad Steel equipment now at work includes vats for cylinder molds, mixers for fillers and coating materials, fibreboard press plates, and stock regulating boxes.



THREE NICKEL-CLAD STEEL PLATES, *5/16″ thick (10% solid nickel) and 215″ wide, form the surface of this "Valley" High Speed Inlet. The distributor roll is fabricated from Monel. Photos, courtesy of Valley Iron Works, Appleton, Wis.*

For further information, write today for "Lukens Clad Steels" and Technical Bulletin T-4, "Methods for the Fabrications of Lukens Clad Steels."

Please give Company, Name and Title. Address: The International Nickel Company, Inc., 67 Wall Street, New York 5, N. Y.

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MONEL • "K" MONEL • "S" MONEL • "R" MONEL • "KR" MONEL • INCONEL • "Z" NICKEL • NICKEL

Sheet...Strip...Rod...Tubing...Wire...Castings

PAPER
TRADE JOURNAL
Title Reg. U. S. Pat. Off.
Henry J. Berger, Editor

COMING EVENTS IN PAPER INDUSTRY

New England Section. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Delaware Valley Section. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

Lake States Section. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

Kalamazoo Valley Section. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

Empire State Section. Technical Association of the Pulp and Paper Industry—Second Thursday of each month at the Woodruff Hotel, Watertown, N. Y.

Chicago Professional Paper Group. Third Monday of each month except July and August at Chicago Bar Association, Chicago, Ill.

A COURAGEOUS LEADER PASSES

A tragic shock throughout the nation was produced last Thursday by news of the death of President Roosevelt. It was believed for some time past that the president was not in robust health and sensational stories regarding his condition were from time to time spread in the public press and through other agencies. These had, however, been considerably allayed of late so that his death at this time was altogether unexpected and produced a severe and depressing reaction.

Mr. Roosevelt was an unusual man. He lived in an unusual era and he was undoubtedly the most outstanding personage of these times.

He was a courageous man. This was demonstrated not only in his political life but in his private life as well. It was first demonstrated politically when, as a young man, he was elected a Democratic senator in overwhelmingly Republican Dutchess County and one of his first acts was to prevent the appointment to the United States Senate of a candidate who was influential and wealthy, but who was not otherwise qualified for the position. Mr. Roosevelt has continued to be a crusader ever since that initial instance.

His courageous fight against a dread disease which crippled him for life, but could not repress him from rising to an exalted position, has long compelled admiration.

The true worth of many of Mr. Roosevelt's acts will, of course, have to be evaluated by history, but his leadership in the war, it is generally admitted by friend and foe alike, has been brilliant and assures him of a high place in history.

Vice President Truman, who became president several hours after Mr. Roosevelt's death is also a liberal, but is probably more conservative than his predecessor. He has already given evidence that he will prosecute the war on both fronts vigorously with a view to attaining victory as early as possible, and that he also will bend every effort to consummating a just and lasting peace.

URGES REPEAL OF REPRICING

Renegotiation and heavy war taxes obviate the need for compulsory repricing of contracts, the National Association of Manufacturers stated April 16 in a special supplement to its weekly news release.

Re-emphasizing the association's opposition to war profiteering, the NAM urged that profit recapture be applied in a most careful way since in numerous cases the financial strength and the future capacity of industry to employ were involved in renegotiation and repricing procedures.

The news supplement, carrying the text of a statement on compulsory repricing and renegotiation filed with the Ways and Means Committee of the House of Representatives, pointed out that: "Simultaneously with its drastic powers of taxation and renegotiation, the government is forcing companies to accept reductions in contracted prices prior to the fulfillment of the contract.

"This mandatory repricing power is backed by the threat of plant seizure. We strongly urge the Congress to repeal the compulsory repricing power established under Title VIII, Section 801 of the Revenue Act of 1943.

"With an excess profits tax of 95%, manufacturers strongly feel that additional profit control is unnecessary, but if the services and Congress continue to insist on further wartime control, it is only reasonable that the services should be forbidden to arbitrarily fix prices in advance of performance and then later renegotiate profits on an over-all basis. If one or the other power is to be continued, industry almost unanimously agrees that it should be that of renegotiation which is exercised after the facts are known and not before."

The statement cited seven specific reasons for repeal of compulsory repricing powers:

"1. Profit recapture from war contractors and subcontractors, is in the first instance brought about through renegotiation.

"2. Further profit recapture is accomplished by severe normal tax, surtax and excess profits taxes.

"3. The combination of renegotiation and taxation, applied to profits have been earned, makes compulsory repricing of contracts before profits are determined completely unnecessary.

"4. Repricing in advance of contract performance depends upon voluminous cost accounting estimates based upon past production volume. Costs determined on a large volume may be misleading when applied to a smaller volume. Prices established on the basis of large volume could easily be below actual cost when cutbacks and cancellations reduce that volume.

"5. The mandatory repricing of existing contracts before completion may result in an over-all loss on the entire production for the year, a result which would not have occurred in the case of renegotiation which takes place after the facts are known.

"6. Compulsory repricing of existing contracts destroys the sanctity of contract between government and individuals which has characterized American progress.

"7. When manpower in the services and in industry should be devoted to winning the war, vast burdens of cost and analysis, filing of statements and the great administrative details of compulsory repricing are being added unnecessarily to similar burdens of original price determination, renegotiation and taxation."

Use More Newsprint

Daily newspapers reporting to the American Newspaper Publishers Association consumed 202,802 tons of newsprint paper in March 1945 compared with 201,708 tons in 1944 and 258,518 tons in 1941. This was an increase in March 1945 over March 1944 of 0.5% and a decrease under March 1941 of 21.6%. The year 1941 is the base for calculating allowable use by newspapers.

The total estimated newsprint consumption in the United States for March 1945 was 279,726 tons which includes all kinds of uses of newsprint paper. For the first three months of 1945, it was estimated to be 776,630 tons.

During the first three months of 1945 the reporting newspapers used 563,057 tons of newsprint, a decrease of 2.7% under the first three months of 1944 and a decrease of 20.4% under the first three months of 1941.

Stocks of newsprint paper on hand with newspapers reporting to the ANPA were 46 days' supply at the end of March 1945 which was a decrease of 4 days' supply from 50 days on hand at the end of February 1945.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1945		Corresponding Weeks—1944	
Mar. 3	87.8	Mar. 4	87.0
Mar. 10	87.7	Mar. 11	88.5
Mar. 17	89.4	Mar. 18	90.7
Mar. 24	92.1	Mar. 25	88.5
Mar. 31	88.9	Apr. 1	85.7
Apr. 7	*86.8*	Apr. 8	86.2

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1944	88.7	88.5	88.1	87.6	88.7	89.8	80.3	90.6	88.2	92.5	90.6	82.4	88.1
1945	86.7	89.4	*90.2*										

COMPARATIVE YEARLY SUMMARIES

	1938	1939	1940	1941	1942	1943	1944	1945
Year to Date	67.3	79.9	85.2	89.6	103.3	88.7	88.3	*88.3*
Year Average	71.5	83.4	85.6	97.4	90.4	87.8	88.1	

*Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

Current Weeks—1945		Corresponding Weeks—1944	
Mar. 3	96	Mar. 4	95
Mar. 10	94	Mar. 11	95
Mar. 17	95	Mar. 18	95
Mar. 24	99	Mar. 25	97
Mar. 31	100	Apr. 1	93
Apr. 7	92	Apr. 8	94

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1944	90	96	95	96	96	96	85	96	92	95	95	85	93
1945	91	95	*97*										

†Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

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LYDDON & COMPANY (AMERICA) INC.

EXPORTERS OF WOOD PULP TO BRITAIN, SOUTH AMERICA AND ALL OTHER WORLD MARKETS

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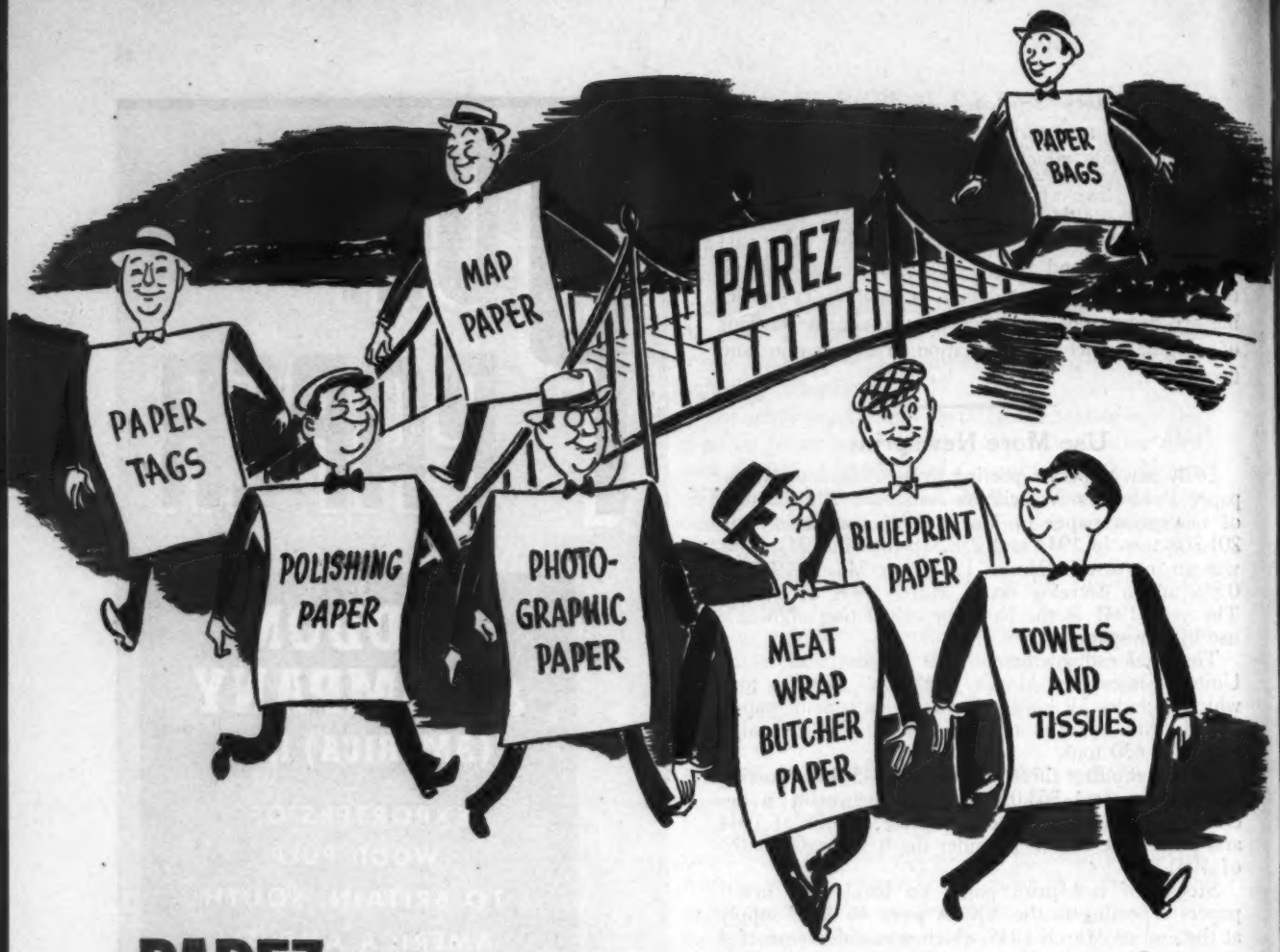

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When PAREZ** 607 is converted into the Cyanamid-developed active colloid for incorporation into paper, it helps paper bridge the gap between its own qualities and those of other materials. Wet or dry, paper treated with PAREZ, Cyanamid's new melamine paper resin, is stronger and tougher... has improved tensile and bursting strength ... plus folding endurance and improved printability due to lack of waviness and curl.

There is also an important cost advantage. Paper may bear a higher ratio of value to cost than it would if it lacked the PAREZ wet strength features. Possibilities of profit on articles for which paper has long been the established material are thus improved because more value is built into them.

PAREZ 607 for wet strength papers helps produce extraordinary "above-the-line-of-duty" paper products, meeting super-specifications for military demands.

The war-proved applications for improved wet and dry strength papers made possible with PAREZ, point the way to new consumer and industrial peacetime product uses. Full details on the many advantages imparted to paper by PAREZ are available from Cyanamid.

**Trade-mark of American Cyanamid & Chemical Corporation covering its synthetic resins for use by the paper industry. The processes under which PAREZ is applied in the production of wet strength paper are covered by U. S. Patents Nos. 2,291,079, 2,291,080, and 2,345,543, and U. S. Patent Application Serial No. 453,032.

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Section of the
TECHNICAL ASSOCIATION
OF THE PULP & PAPER INDUSTRY
122 E. 42nd St., New York 17, N. Y.
Edited by R. G. Macdonald, Secretary

Changing Pattern in Wood Pulp Production

By Rex Vincent[1]

Abstract

The trends in the production of sulphate, sulphite, and semibleached pulps are discussed. It is expected that new production will be devoted to sulphate pulp and that the bleached kraft and sulphites will have an increasing consumption.

A discussion of such a topic as this requires some preliminary statements in the way of definitions and sources. First there is the period of time, which is frequently overlooked. When one speaks of "pre-war" it must always be remembered that one is speaking of a time that existed nearly *six* years ago. Now, that is not the ancient past but, in the paper industry, it falls into the classification of a "long time ago." During a like period, even in peace time, many changes take place—changes in personnel, in management, in production rates, in types of paper made and consequently in the types of pulp purchased. Since "pre-war" was nearly six years ago and "post-war" in the sense of normal commerce might be two years hence, the interval of war influence might be considered as being a period of 8 to 10 years. During that time everything in the industry has been upset and since there is a high degree of familiarity with the meaning of the term "upset," further explanation is unnecessary.

In ten years it is possible for new habits to be formed, new associations, new and different patterns of thinking to be acquired, and all these have had, and will have, their effects on the subject under discussion. For example, the idea has been formed, during this time, that the U. S. is largely self-sufficient in wood pulp and this is usually qualified by the remark "if you include Canada." Another idea, which has grown, concerns the change from "pre-war" to "war." People have come to regard that as a sharp change, a clean line—because in the stress of living from day to day they have forgotten the pre-Pearl Harbor period and the months that were labeled "Phony War." The descent into the present day turmoil was very gradual, so gradual that current paper quality is not thought so bad until someone brings out a sample made in 1940. These things are stated to help emphasize the point that it is difficult for any group or association of individuals to go back to previous practice. The change is made forward from the present position. If you are estimating what is apt to happen at some future time you must begin with a knowledge of past practice and a thorough understanding of the present position. The history will enlighten you as to direction but the current position must be used to gain any idea of the extent of the movement.

It is questionable as to whether trends which were in evidence up to 1940 are of much value, yet they must be used to determine which direction the industry was following. This is the only right method for learning what the war has interrupted in the trend of pulp utilization.

Kraft Pulp

As to sources used for figures, reference is made to statistics of the U. S. Pulp Producers Association, the W. P. B., the Bureau of Census, the APPA, and other similar material published by agencies, associations, and trade journals.

The decade 1930-1939 brought about several interesting changes in pulp utilization.

1. Unbleached kraft production in the United States increased 202% during those ten years.
2. Bleached kraft production in the United States increased 547% during the same period.
3. All pulp production in the United States increased only 54%.
4. In 1930, imports of unbleached kraft formed 31% of the total kraft consumption but by 1939 this had dropped to 17.5%.

Thus, during that 10 year period, unbleached kraft consumption increased about four times as much as total pulp consumption, while bleached kraft increased ten times as much. The domestic production increases are reflected in diminishing kraft imports. This trend in kraft, so emphatic before the war, has continued during the war, largely because of the packaging requirements of the services and their need for strong, highly specialized papers. Added to this was the almost complete lack of imports.

This rate of expansion in kraft pulp should be examined further, particularly as regards market pulp and total pulp. Total pulp is all the production, plus imports, less exports, while market pulp is only that pulp available on the market and is composed of all domestic sales, plus all off-shore imports, plus 50% of Canadian imports, as it is estimated that the other 50% from Canada goes to affiliated consumers. These figures are shown in Table I.

TABLE I.—RATIO SULPHITE TO SULPHATE TOTAL AND MARKET

	1939	1940	1941	1942	1943
U. S. produced Total sulphite	1,946,452	2,607,789	2,918,780	2,930,272	2,436,502
U. S. produced Total sulphate	2,962,657	3,747,992	4,526,611	4,738,266	4,235,724
Ratio sulphite / sulphate	0.657	0.696	0.645	0.618	0.575
Market sulphite	1,451,221	1,215,900	1,346,207	1,202,625	895,998
Market sulphate	737,654	463,192	410,466	444,662	339,915
Ratio sulphite / sulphate	1.967	2.625	3.279	2.705	2.636

[1] Member TAPPI; Technical Consultant, Bulkley, Dunton Pulp Co., Inc., New York, N. Y.

The above figures demonstrate that the increase in pulp production over these past five years has been largely integrated kraft production and shows that the trend established before the war has continued through the war years. In other words, it can be seen that more and more kraft papers are being made in integrated mills and must conclude that as time goes on there will be less and less domestic kraft pulp for sale. These mills who must buy kraft pulp will be looking to imports for their major source of supply.

A further check on these trends in kraft pulp can be obtained by examining data from the Department of Commerce and the W.P.B. on the components of various grades of paper and paperboard. In 1939 bleached kraft formed no part of book papers, and only 1.4% of fine papers; by 1944 these figures had changed to 12.6% of book paper and 9.5% of fine paper.

Therefore, on sulphate pulps these conclusions can be drawn:

1. The expanding production indicated will continue for some time and most of the new pulp production will be in sulphate.

2. There will be a greatly expanded use of bleached kraft pulp.

3. Most of the kraft pulp, bleached and unbleached, purchased by consumers, will be imported.

4. The large volume kraft papers, such as bag, wrapping, etc., will be produced in integrated mills.

Sulphite Pulp

In sulphite, the tendencies have been different in several ways. The proportion of sulphite being used, as compared to total pulp, averaged 38% during the early thirties. In 1940 this had fallen to 31.4% and for 1943 it was 29.6%. Thus, the expansion in sulphite during recent years has not kept pace with that in kraft. There has also been a change within sulphite that is kindred to a change within sulphate and that has been the increasing production of bleached pulps. On the whole, the consumption of unbleached sulphite has been fairly constant with only a slight downward trend in the years just prior to 1941. This could be caused, in part, by the steadily increasing tonnage of box board which used far more waste than pulp. On the other hand the consumption of bleached sulphite in the manufacture of paper had been steadily increasing in a direction that, up to 1941, was obvious to everyone in the industry.

This development has had its effects on the producers of pulp who have installed bleach plants or were about to convert when the war came. In Sweden, the conversion to bleached pulps and still further, to dissolving pulps, has been going on apace during the war. Sweden has just about doubled her capacity for dissolving pulps and will probably exhibit a strong desire to sell that quality in this market. Before the war these pulps were nearly all sold on the continent.

As can probably be seen by now the developments in sulphite are mixed. They are complicated by the rising bleached production which is conflicting with the increased use of bleached sulphate and the switch from bleached paper pulps to dissolving pulps. This latter development has been aided by the pulp producer's desire to get as much dollar return from his forests as possible and there has also been an insistently rising demand for viscose rayon pulp. In 1940 the consumption of these pulps was equal to 16% of bleached sulphite capacity and in 1942 it was 21%. It is expected that this will rise to at least 25% in post-war years.

It is believed that because of the conflict between bleached sulphite and bleached sulphate, the rising trend in bleached sulphite will be reversed in the post-war years to a degree depending on how rapidly the production of bleached sulphate can be increased and how close together the two pulps become with respect to price.

Unbleached sulphite seems due for an increased utilization because of several factors. Some of these are reflected from the discussion above, but others are such influences as increased production of groundwood papers, particularly those based on the new bleached groundwood. A factor which will probably have an effect on this pulp is the planned expansion in the production of machine coated papers. It should be pointed out that this opinion is at variance with that expressed by a statistical research organization.

Semibleached Pulps

A development which lies in between bleached and unbleached sulphite and which was just beginning to appear before the war is semi- or partially bleached sulphite. This pulp was made by several mills at the time; some for experimental purposes and, in one case, the bleaching was used in connection with hydraulic barking. This pulp was really different in more ways than just color. As a matter of fact, the difference in other characteristics was greater than the difference in color. Good, bright, unbleached sulphites before the war were running in the neighborhood of 60 to 62 G. E. brightness and the partially bleached pulps were never much above 65. But the color was light fast and on the yellow side which resulted in brighter papers when tinting colors were used. The physical characteristics were changed by the bleaching so that the pulp was stronger in nearly all respects. Some consumers reported that this pulp reacted in beaters and jordans much the same as a Mitscherlich pulp.

Semibleached sulphite will undoubtedly reappear after the war. There has already been evidence that several Swedish mills intend to produce it. There is another possibility and that is hydraulic barking. This method of barking, along with whole log chipping, is so great a step toward full utilization of timber that pulp mills must adopt it. They cannot disregard the 20% saving in wood since that means a 20% addition to their timber reserve. But hydraulic barking and whole log chipping is not an unmixed blessing and it may some day be desirable to top it off with a partial bleach on the pulp.

Of course, pulp imports will reflect all these things. There will be semibleached krafts as well as semibleached sulphite. There will be increased offerings of hardwood pulp as it becomes necessary to fill out a diminishing supply of spruce. There will be more of what are called "special" pulps—pulp designed for a particular use. These tendencies are somewhat opposed to the trends in import pulps before the war when they consisted primarily of straight prime unbleached sulphite and the same kind of unbleached kraft. Immediate post-war imports will be simply "pulp and all we can get" until the first thirst is satisfied and then the imports will begin to reflect the desires of the producers which are, in general, to raise the level of quality and price of their pulps. It is very unlikely that there will ever again be a surfeit of middle and low grade foreign pulps seeking a buyer in this market. Proof of this lies funda-

mentally in the timber reserves of the major pulp producing countries. These are too limited now, and will be more so at the end of the war, to permit cutting merely for the sake of continuity in mill operation. It will take many years for the forests in Europe to catch up with the devastation and overcutting of this war, and the reconstruction work will require vast quantities of paper.

Thus, in general, while pulp may not be scarce or short, it will hardly be plentiful. The Neubrech Report, issued by the Department of Commerce, indicates a rather narrow balance for the world. Any disruption in shipping facilities could easily upset this balance causing acute shortages in certain areas.

During this period—the first three years after "V" Day, the trends which have been mentioned will not be as pronounced as they will later on. Trends established during these war years will probably continue, gradually changing as the supply of pulp increases. Following a natural line, the industry's increasing supply will bring with it the variations and improvements in qualities outlined. The full effects of the trends established in this country will not be fully realized for some time because they require new production facilities and expansion to current plants. The heavy machinery required for this will not be available for some time after "V" Day.

Basis Weight of Paper and Paperboard*

Revision of Tappi Official Standard T 410 m-44

The United States commercial standard for expression of the basis weight of paper is the weight in pounds of a ream of 500 sheets of a given size. The standard commercial ream in this country for certain types of paper was formerly 480 sheets and this count is still used in some countries. In research work the metric system is often more convenient and the weight is expressed in grams per square meter. In the printing industry, calculations involving weight are often based on a 1000-sheet unit and this unit is used in the United States Government specifications for printing papers and some other papers.

The basis weight of paperboards is expressed as the weight in pounds of 1000 square feet. Generally, any heavy, stiff sheets over 0.012 inch thick are considered paperboards. The term also includes certain materials of lesser thickness, such as corrugating paper and chipboard. With some types of paperboard it is customary to express the weight in terms of the number of sheets of a given size in a 50-pound bundle. This can be readily calculated by dividing 50 pounds by the weight in pounds of one sheet of the given size, i.e., by 1/500 of the ream weight.

Apparatus

The balance used for weighing paper and paperboard shall have a sensitivity of not more than 0.25% of the load applied and shall be so graduated that readings of this degree of accuracy can be made. The balance should preferably be a specially constructed sheet-weighing device that indicates the equivalent weight in pounds of a 500-sheet ream of paper, when one sheet of a given size is weighed; or the equivalent weight of 1000 square feet of paperboard in pounds when one sheet 1 square foot in size is weighed. For small samples an analytical balance may be used. The balance shall be protected from air currents while weighing.

When a template is used for preparing the sheets, it is recommended that the paper be cut to exact size with a sharp knife. A paper cutter having an attachment for ensuring parallelism of the opposite edges is also recommended.

Calibration

The balance shall have been calibrated not more than 30 days prior to the test, both with increasing and decreasing loads by applying accurate weights. Care shall be taken after calibration that the level of the balance is not disturbed.

Test Specimen

The specimens of paper for test shall consist whenever possible of not less than ten sheets each at least 100 square inches (645 sq. cm.) in area. The specimens of paperboard for test shall consist of not less than five sheets each at least 1 square foot in area. The specimens shall be conditioned for testing according to TAPPI Standard T 402 m.

Procedure

The test shall be made in an atmosphere conditioned according to TAPPI Standard T 402 m. The area of the specimen shall be determined to the nearest 0.25% of its total area. In order to obtain this degree of precision in the area, the dimensions should be measured to a precision of 0.1%. The weight of the specimen shall be determined to the nearest 0.25% of its total weight. Calculate the weight per ream from the measured area of the specimens and their weight.

If the special sheet-weighing balance is used, the dimensions of the sheets should be within 0.1% of the required size; otherwise, for precise work, a correction must be applied. If weighed in grams, the weight of ten sheets multiplied by 1.102 gives the equivalent weight in pounds of 500 sheets of the same dimensions.

Report

For paper the weight shall be expressed in at least two of the following ways: (1) The equivalent basis weight in pounds for a ream consisting of 500 sheets, 24 by 40 inches in size; (2) the weight in grams per square meter; and (3) the equivalent weight for the ream size commonly used by the paper industry for the particular kind of paper.

Report the basis weight of paperboard in pounds per 1000 square feet.

The weight shall be reported to three significant figures.

If the total area of the test specimens is less than that specified, the area used shall be stated.

Precision

Duplicate determinations from different sets of samples from the same shipment and on different instruments should agree within 2%.

* Reprints of this standard may be secured from the Technical Association of the Pulp and Paper Industry, 122 E. 42nd St., New York 17, N. Y., at 25 cents each.

Additional Information

For weighing specimen sheets on a gram balance or on a paper scale:

If a = length of sample in inches,
or y = length of sample in centimeters;
b = width of sample in inches,
or z = width of sample in centimeters;
g = weight in grams of sheets weighed,
or p = indicated weight on scale for 500-sheet ream;
and n = number of sheets weighed; then
weight in pounds 25 x 40 - 500 is given by:

$$\frac{1102\,g}{abn} \text{ or } \frac{7111\,g}{yzn} \text{ or } \frac{1000\,p}{abn} \text{ or } \frac{6451\,p}{yzn}$$

and weight in grams per square meter is given by:

$$\frac{1550\,g}{abn} \text{ or } \frac{10{,}000\,g}{yzn} \text{ or } \frac{1406\,p}{abn} \text{ or } \frac{9070\,p}{yzn}$$

In the following table conversion factors are given for converting the weights of some customary trade sizes of 500-sheet reams (t) to and from pounds 25 x 40 - 500 (s) and grams per square meter (m).

Kind of paper	t Trade size	A (s to t)	B (m to t)	C (t to s)	D (t to m)
Writing and printing....	17 x 22	0.374	0.266	2.674	3.760
(Demy size)	17½ x 22½	.394	.280	2.540	3.571
Blotting	19 x 24	.456	.324	2.193	3.083
Cover	20 x 26	.520	.370	1.923	2.704
Tissue (double crown size)	20 x 30	.600	.427	1.667	2.343
Cardboard	22 x 28	.616	.438	1.623	2.282
Bristol and tag	22½ x 28½	.641	.456	1.559	2.195
News and wrapping	24 x 36	.864	.614	1.157	1.627
Book	25 x 38	.950	.675	1.053	1.480
(TAPPI standard size)	25 x 40	1.000	.711	1.000	1.406
(Metric size)	1 sq. meter	1.406	1.000	0.711	1.000
Paperboard	1000 sq. ft.	.288	.205	3.472	4.881

In the above table (except for the metric size and for paperboard)

A = 1/1000 area of trade size sheet in square inches
B = 0.711A
C = 1/A
D = 1.406/A

If the given trade size is in 480 sheets, then the above factors A and B are multiplied by 48/50 (or 0.960) and C and D by 50/48 (or 1.042) for conversion.

Examples:

Pounds weight 25 x 40 - 500 × A = Pounds weight given trade size. E.g., 100 pounds 25 x 40 - 500 × 0.600 = 60.0 pounds 20 x 30 - 500.

Grams per square meter × B = Pounds weight of given trade size. E.g., 60 grams per square meter × 0.711 = 42.7 pounds 25 x 40 - 500.

Pounds weight of given trade size × C = Pounds weight 25 x 40 - 500. E.g., 32 pounds 24 x 36 - 500 × 1.157 = 37.0 pounds 25 x 40 - 500.

Pounds weight of given trade size × D = grams per square meter. E.g., 50 pounds 25 x 38 - 500 × 1.480 = 74 grams per square meter.

Formaldehyde

The Reinhold Publishing Company recently published Formaldehyde by J. Frederick Walker, Chemical Research Division, Electrochemicals Department, E. I. du Pont de Nemours, Niagara Falls, N. Y. This book (397 pp. 6 x 9¼) is one of the Monograph Series of the American Chemical Society.

A subject such as this becomes of interest to the technical men of the paper industry as they get into the study of plastic coatings and adhesives. Among the subjects covered are: formaldehyde production, commercial solution, physical and chemical properties, polymers, reaction with various reagents especially with phenols and ureas, analysis, and hexamethylentramine.

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd street, New York 17, N. Y., at $5.50 per volume.

To Head Derived Products Div.

Dr. Alfred J. Stamm, a member of the Forest Products Laboratory staff for nearly 20 years, has been appointed chief of the Laboratory's Division of Derived Products, Director Carlile P. Winslow announced today. Dr. Stamm succeeds the late Dr. Earl C. Sherrard, who died October 5, 1944.

A native of Los Angeles, Cal., Dr. Stamm was graduated from the California Institute of Technology at Pasadena. He taught chemistry at the University of Wisconsin from 1922 to 1925, meanwhile taking his master's degree and his doctor of philosophy degree in physical chemistry. In 1925 Dr. Stamm joined the Laboratory staff as a chemist.

His research at the Laboratory has brought him international recognition in the field of colloid and physical chemistry. He has done much productive research on the capillary structure of wood, measuring the size of communicating openings between fibers and through fiber walls that are below the range of microscopic visibility by means of physical methods.

Dr. Stamm has also investigated the electrical properties of wood, various aspects of the way moisture is held in wood, and the molecular properties of wood constituents. His research findings have resulted in new and improved treatments for wood by means of which its swelling and shrinking with changes in moisture content are markedly reduced.

Products that have been produced at the Laboratory with these treatments include impreg and compreg, which consist of wood that has been impregnated with chemicals that form synthetic resins within the wood. Another one of the products, staypak, is a form of compressed wood which, although it does not contain resin, swells and shrinks much less than other compressed woods.

Compreg has been in use during the war for aircraft and motor-test propellers, dies for forming metal airplane parts, and other military products, some of which are still secret.

In 1929 Dr. Stamm spent a year in Sweden as holder of a Rockefeller Foundation fellowship awarded him for his early work in physical chemistry at the Forest Products Laboratory. There he worked with Prof. The Svedberg, noted Swedish scientist, at the University of Upsala. While in Sweden, he represented the United States as a delegate to the International Forestry Convention at Stockholm.

Dr. Stamm lives at 3405 Crestwood Drive, Shorewood Hills. He is married and has three children.

Electronic Resistance Thermometer

Bailey Meter Company, Cleveland 10, Ohio, has published Bulletin No. 230-A featuring Bailey Pyrotron Electronic Resistance Thermometers in indicating, recording and controlling models, for temperature ranges between the limits of minus 100 degrees F. and plus 1200 degrees F.

The instruments are said to be well suited for marine, mobile or other classes of severe service since no galvanometers or millivoltmeters are used. No parts move in the measuring circuit except during temperature changes.

The 12-page bulletin lists outstanding features; describes the electronic detector and motor control; gives definite information on: ranges, power supply required, speed of response, accuracy, sensitivity, installation, standard chart ranges, automatic control application, alarm contacts, temperature sensitive elements, and measuring circuits.

Identification of Melamine and Urea Resins In Wet Strength Paper*

By R. W. Stafford[1], W. M. Thomas[1], E. F. Williams[1], and N. T. Woodberry[1]

Abstract

The details of two new laboratory methods for the identification of melamine and urea resins in wet strength paper are reported. The first procedure involves a dye-staining test for melamine, which in some cases is also applicable to urea resins and proteins. The second procedure describes an optical method for the specific identification of urea after hydrolysis of the resin and precipitation with xanthydrol. Reported procedures for the detection and identification of protein wet strength additives as well as general methods for resins in paper are listed and discussed. All the various techniques have been arranged in a convenient order, according to applicability and time requirements.

The past ten years have witnessed a marked increase in the production of wet strength papers, with recent emphasis mostly confined to processes involving the use of either melamine-formaldehyde or urea-formaldehyde resin. Since the application of these resins to the manufacture of wet strength paper has been initiated during the same period, the paper mill chemist has been faced more and more frequently with the problem of examining competitive samples, shipments of waste paper used as a raw material, and even unidentified broke from his own mill, to determine the nature of the wet strength treatment that may have been used.

Identification of the means whereby paper has been given wet strength is by no means simple, since a great number of materials or processes has been used or claimed for this purpose. In a recent literature survey by Collins *(1)*, a variety of treatments is mentioned, the following being known either to be in commercial use or to have been used in the past:

1. Parchmentizing
2. Proteins
3. Viscose
4. Natural gums (e.g., locust bean gum)
5. Resins such as melamine-, urea-, and phenol formaldehyde

In addition, there is always the possibility that one may encounter a wet strength sheet made experimentally by use of one of the many other miscellaneous materials that have been suggested or by new processes that may be developed from time to time. This discussion, however, will be confined to nitrogenous additives, including proteins and the amino-aldehyde resins as the most important members of this class.

Unfortunately, there is no one simple test that, in a few minutes or by the use of some magic indicator solution, will positively specify just which one of the above materials is present in a given sample of paper to the exclusion of all other possibilities. Occasionally the answer may be obtained in a relatively short time, but usually the slow process of "trial and error" must be employed. Likewise, it sometimes may be difficult or impractical to make a positive identification of the nature of the treating agents, especially if more than one material or method of treatment has been used in making the paper. However, it is believed that with the procedures now available, substantially correct identification of the nitrogenous "wet strength" materials present in an unknown sheet of paper can usually be made in the ordinary control laboratory within a reasonable time, say from an hour to a day or so.

Many of the available tests and procedures are already reported in the literature, and are collected here for ready reference. These procedures, however, are confined to the detection of the proteins and neglect the newer and more important amino-aldehyde resins. The bulk of this paper, therefore, is devoted to a description of two new techniques: one a semi-quantitative "dyeing" procedure for differentiating among melamine resins, urea resins, and proteins, and the other an improved xanthydrol test for urea. These techniques are included as steps in a tentative scheme of analysis which is applicable to virtually all samples.

Classification of Procedures

Methods designed for the detection and recognition of nitrogenous wet-strength additives may be divided into two arbitrary classes:

A. General methods, including preliminary examination, elementary analysis by fusion with metallic sodium, loss of wet strength on acid hydrolysis, etc.

B. Specific methods, including the various color procedures for the constituent *in situ* and/or after removal from the test sheet, and also those techniques based on the preparation of a characteristic derivative of the constituent after its removal from the sheet.

The various methods of Class B may be further subdivided with respect to ease and speed of application. In the discussion which follows, they have been arranged in order of increasing time required for the performance of the test.

General Methods

Such procedures are rapid methods yielding results which require not only experience for evaluation, but also correlation with other data. The more common are discussed briefly as follows:

Preliminary Examination

Observation of the nature or grade of the unknown sample by the experienced paper man often results in saving of time; e.g., if the sheet is coated in any way, it would obviously be desirable to remove this coating before testing for various resins in the base sheet. It is also conceivable that urea or melamine resins might be present both in the base sheet and in the coating composition. This might present difficulties, although it would often be possible to get around this complication by sectioning the sheet or removing the coating chemically, and then comparing the results of some of the qualitative tests applied separately to the coated surface and to the interior of the sheet. In the case of waxed or impregnated

* Presented by title at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 19-22, 1945.

[1] Stamford Research Laboratories, American Cyanamid Co., Stamford, Conn.

papers, it may be desirable to attempt to extract the wax or impregnant with a suitable solvent, prior to the application of the resin tests. A small portable source of ultraviolet light is often of value in detecting such coatings and impregnants.

The grade of paper being examined is also of importance, e.g., if it is a towelling grade having only slight to moderate wet strength, the presence of a high proportion of "wet strength" resin would not be expected, and the sensitivity of the proposed test procedures would have to be taken into account. Again, parchment paper is characterized by having both wet strength and grease resistance, while greaseproof and glassine papers ordinarily show grease resistance, but do not have wet strength. Although the difference between those grades may be apparent to the trained observer, the inclusion of wet strength resins in greaseproof and glassine papers may necessitate the use of some of the subsequent tests to classify such samples properly.

In all instances, the degree of wet strength should be noted, as in the majority of cases it will be proportional to the amount of resin present. Of course, this is not always true, particularly when different types of resins are involved.

Burning a portion of the sample is still another preliminary procedure which may prove helpful, by resulting in the evolution of characteristic odors too strong to be masked by the burnt toast odor of the charring paper. The unforgettable odor of burnt hair, suggesting the presence of the proteins, is one example; the penetrating odor of formaldehyde is another significant indication.

Elementary analysis

Analysis by fusion with metallic sodium is a valuable qualitative procedure which permits the detection of sulphur, nitrogen, halogens, and phosphorus. This rapid method, which is discussed in considerable detail in standard organic analysis texts such as Kamm *(2)* and Shriner and Fuson *(3)*, effects the conversion of the listed elements to water-soluble compounds, which are then tested for in solution by the use of appropriate reagents. In the case of paper samples, the fusion is carried out by rolling a piece of metallic sodium (the size of a small pea) in a strip of the paper to be tested, and then heating the sample strongly in a soft-glass 3-inch test tube. The melt is decomposed by quenching the tube and its contents in 5 to 10 ml. of water, and the usual tests are applied to the filtered solution.

An alternative, semimicro method for nitrogen alone consists of decomposing a few strips of sample paper with a small volume of concentrated sulphuric acid and a crystal of copper sulphate in a small Erlenmeyer flask, cooling and cautiously making alkaline with strong caustic, and then finally distilling any liberated ammonia into a hanging drop of dilute hydrochloric acid on a microscope slide. (In effect, a small-scale qualitative Kjeldahl.) The ammonia is then detected optically by the characteristic crystals it yields upon the addition of chlorplatinic acid to the test drop *(4)*.

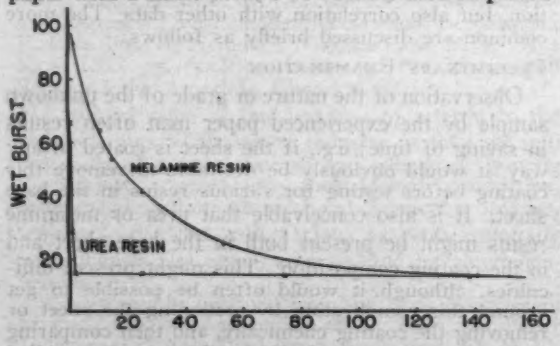

FIG. 1

Relative Wet Strength Loss on Acid Hydrolysis (pH 3 to 4)

Subsequent to the identification of the nitrogenous constituent present, it is possible to estimate its proportion from the total nitrogen as determined by quantitative analysis. Multiplication of the per cent nitrogen found by the factors 2.6, 4.3, and 6.38 yields the per cent trimethylol melamine, dimethylol urea, and protein, respectively. Although it is true that different grades of melamine and urea resins contain varying proportions of nitrogen, it is believed that the use of the above factors will be sufficiently accurate for most purposes.

Hydrolysis

Hydrolysis treatments applied to the unknown sheet frequently enable classification of the wet strength agent into one of several groups. Such a procedure is particularly valuable if it is already known that the paper has been treated with either a melamine or urea resin, e.g., samples of the "unknown" sheet can be cut into pieces of convenient size, and similar samples prepared of known sheets containing melamine and urea resins, respectively. The wet strength of each sheet is measured before treatment, and then comparable pieces of each sample treated by soaking for an hour at 130°F. in a solution of about 0.1% alum (commercial aluminum sulphate). The wet strength of the treated unknown is then compared with the wet strengths of the two known samples. Under these conditions a melamine resin-treated paper should show less drop in wet strength after the hydrolysis treatment than a urea resin-treated paper.

A similar test can be run under slightly different conditions, as follows. Sheets of each paper sample are cut into pieces about 4 or 5 inches square and added to a bath of 2 liters of 0.25% boiling alum solution. Sheets of each sample are withdrawn at intervals, washed and immersed in cold water for about an hour. Wet burst measurements are then made and the results plotted. Figure 1 shows the results of such a comparison as made on two sheets, one containing a melamine resin and the other a urea resin. The difference between the two is quite evident.

Obviously, modifications and refinements of the hydrolysis procedure may be required to secure the desired information in some cases, and it is quite possible that interfering factors may prevent universal application of such a test.

What appears to be a logical approach to the differentiation of melamine and urea resins in paper, by a hydrolysis procedure, has been made by Britt as reported in a recent article *(5)*. By this procedure paper samples are treated in hot buffer solutions of various pH values at 200°F. for 30 minutes, and the comparative losses in wet tensile strength observed.

Specific Methods

Jorissen Formaldehyde Test *(6)*

Boil a few small squares of the sample in question with approximately 5 ml. of water containing 5 drops of 1:4 HCl. Cool, add a pinch of phlorglucinol, and

make alkaline with caustic. A red coloration indicates the presence of formaldehyde. Acetaldehyde gives an orange-yellow coloration which deepens on standing. Under the above conditions, the reagent alone gives a lavender coloration. The test is quite sensitive; formaldehyde has been detected without difficulty in a 0.25-inch square of test paper containing 2% melamine resin.

This test has proved extremely valuable as a means of preliminary classification of possible wet strength treatments.

Biuret Protein Test *(6)*

Add 2 ml. of water to 5 to 10 mg. of the unknown material (isolated by extraction of the sheet with 1% NaOH solution) in a 3-inch test tube, followed by 1 to 2 drops of dilute copper sulphate solution. Then add 2 to 3 drops of 50% potassium hydroxide solution, and shake. A delicate violet coloration that deepens on standing is indicative of a protein or protein degradents. The precipitation of copper hydroxide may be prevented by the addition of a few crystals of sugar. Polyhydric alcohols interfere by causing a deep blue coloration. The test is given by both casein and glue.

Millon's Protein Test

According to TAPPI procedure T 415 m-41, approximately 0.5 gram of test paper is cut into small pieces and boiled several minutes with 10 ml. of 1% caustic soda solution, (which dissolves hardened casein). The filtered and cooled extract is neutralized with nitric acid to a phenolphthalein end point, and the neutralized solution is heated with several milliliters of Millon's reagent. The development of a coagulated red mass indicates casein. Since the reaction depends on the presence of tyrosine, it is generally limited to "whole" proteins such as casein and soya, and is not generally given by degraded proteins such as animal glue and gelatin.

Numerous directions for the preparation and use of Millon's reagent have been described in the literature *(7, 8)*. In the authors' laboratory, the following procedure has been found convenient. Millon's reagent is prepared by dissolving 1 part by weight of mercury in 2 parts by weight of nitric acid (sp. gr. 1.42), warming gently until solution is complete, and then diluting with 2 volumes of distilled water. After standing several hours, the supernatant solution is decanted from the crystalline precipitate.

Using *dilute* Millon's reagent (1 drop of reagent prepared as above to 10 drops of water) we have obtained good results in detecting casein without prior removal from the sheet. A small square of paper is immersed in the dilute solution and heated for 5 minutes in a beaker of hot water. Casein gives a positive test (pink to red coloration of the paper) under these conditions; glue, urea-formaldehyde, and melamine-formaldehyde yield negative tests, as does casein hardened with formaldehyde. The test does not appear to be sensitive to proportions of casein much less than 2%.

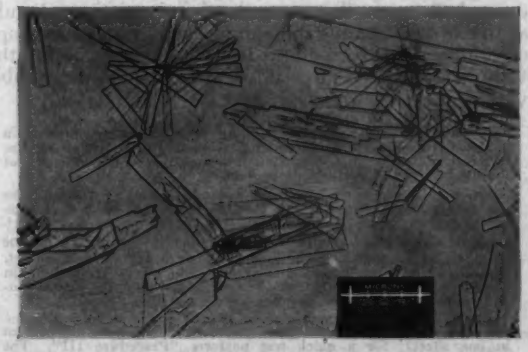

Fig. 2
Dixanthyl Urea Crystals as Obtained by Precipitation from a Urea-Acetic Acid Solution with Xanthydrol

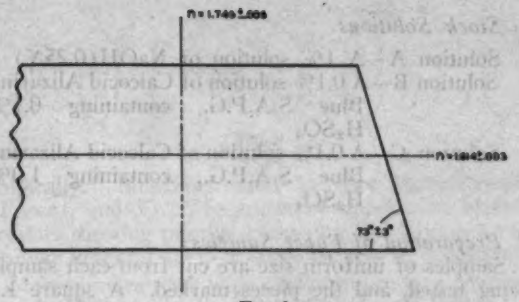

Fig. 3
Diagram Showing Usual Orientation of Dixanthyl Urea

Schmidt's Glue Test

Glue or casein which has been extracted with dilute alkali can be generally differentiated by acidification of the alkaline extract solution with dilute hydrochloric acid. The casein is precipitated, while the glue remains in "solution." In the absence of casein precipitate, the presence of substantial amounts of soluble glue may be confirmed by the application of Schmidt's reagent *(7)*. One volume of the reagent is added to 2 volumes of HCl neutralized paper extract; a white precipitate indicates the presence of glue or other nitrogenous matter. Schmidt's reagent is prepared by dissolving 3 grams of ammonium molybdate in 250 ml. of distilled water, and then adding 25 ml. of dilute (2:3) nitric acid. Since the reagent is not very stable, it should be made up as needed.

An interesting set of color reactions, discussed by Rendle and Franklin *(9)*, may be used to supplement the protein tests described above. Designed for the identification of plywood glues, the tests include determinative staining reactions, *in situ*, on animal or hide glues, blood albumin, casein, and soybean protein. Steinitzer *(10)* also lists a variety of tests applicable to protein materials.

Dye Staining Technique for Melamine Resins

This test is based upon the fact that acid dyestuffs are not substantive to cellulose, and unless mordanted, can easily be washed from cellulose fibers. On the other hand, the acid dyes combine with "protein-like" substances such as wool, glue, casein, and amino aldehyde resins. One of these acid dyes, Calcocid Alizarine Blue S.A.P.G.,* has been chosen as being particularly useful for the present purpose. By use of this dye under specified conditions, untreated paper can be quickly distinguished from paper containing materials such as proteins, urea resins, or melamine resins. By using three different modifications of the same technique, applied to separate portions of the unknown sample, it is generally possible to decide positively whether or not melamine is present or to obtain indications as to the nature of the other nitrogen-containing substances if melamine is not present.

The detailed procedures for performing the tests are as follows:

* Supplied by Calco Chemical Division, American Cyanamid Co.

1. Stock Solutions

Solution A—A 1% solution of NaOH(0.25*N*)
Solution B—A 0.1% solution of Calcocid Alizarine Blue S.A.P.G., containing 0.1% H_2SO_4
Solution C—A 0.1% solution of Calcocid Alizarine Blue S.A.P.G., containing 1.0% H_2SO_4

2. Preparation of Paper Samples

Samples of uniform size are cut from each sample being tested, and the pieces marked. A square 1.5 inches on a side is convenient, and is large enough for spectrophotometric reflectance measurements if such are to be made. In order to make certain that the dye held on any paper sample is due at least to a "protein-like" substance, a piece of known untreated paper is always included with the other test samples. The "known" or control sample should, if possible, be of a type similar to that of the sample being tested, except that wet strength additives should not be present. More important, the control should be similar in color to the sample being tested.

3. Dyeing Procedures

Procedure I.—Use 200 ml. of Solution "B" (0.1% Calcocid Alizarine Blue S.A.P.G., 0.1% H_2SO_4) for every gram of paper. Dye the sheets (including control sample) for 5 minutes at *room* temperature in the bath, which should be stirred frequently to prevent the samples from sticking to each other. The sheets are then washed in three 500 ml. portions of cold water or until the control sheet is free of any surface adsorbed dye.

A blue coloration obtained by use of Procedure I indicates the presence of some sort of "proteinlike" substance.

Procedure II.—Use 200 ml. of Solution "C" (0.1% Calcocid Alizarine Blue S.A.P.G., 1.0% H_2SO_4) for every gram of paper. Dye the sheets (including control sample) for 5 minutes at the *boil*. The sheets are then washed in three 500 ml. portions of cold water or until the control sheet is free of any surface adsorbed dye.

With the increase in temperature and amount of acid as in Procedure II, the two competing reactions which exist in the dyebath have been accelerated. The hot acid rapidly hydrolyzes urea formaldehyde resin, and proteins in some instances. On the other hand, the higher temperature and acid concentration increase the rate of diffusion of the dyestuff so that the samples containing a substance resistant to hydrolysis (e.g., melamine resin) show an increase in the amount of dye picked up.

Procedure III.—Pretreat the samples using 200 ml. of Solution "A" (NaOH) for every gram of paper for 5 minutes at the boil. Rinse the sheets carefully in three 500 ml. portions of cold water, and then perform the dye test as described in "Procedure II".

The pretreatment included in Procedure III removes most of the nitrogenous substances likely to be present in wet strength paper, except melamine resins.

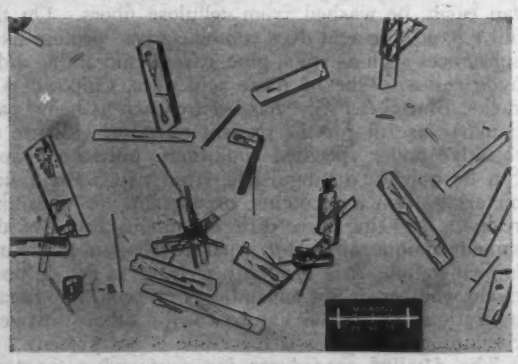

FIG. 4
Dixanthyl Thiourea Crystals as Obtained by Precipitation from a Thiourea-Acetic Acid Solution with Xanthydrol

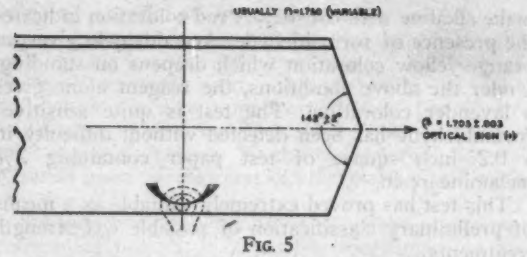

FIG. 5
Diagram Showing Usual Orientation of Dixanthyl Thiourea

In developing the three specific dyeing procedures described above, the dyebath to paper ratio and time of treatment were chosen arbitrarily. As further experience is gained, it is quite possible that modifications of these conditions may be found convenient.

4. Interpretation of Results

Although good results in differentiating various additives that may be present in wet strength paper often may be obtained, by use of the dyeing procedure just described, it is preferable to supplement the dye test results with other data before drawing final conclusions. This is particularly true in view of the wide variety of wet strength agents used in the past, and of the possibility that new materials may be encountered at any time.

A summary of the coloring effects obtained upon application of the specified dyeing procedures, to various types of wet strength paper, is shown in Table I. Before applying the dye test to unknown samples, it is suggested that known samples be treated according to the procedures described, and the results compared with those shown in the table.

TABLE I.—DYE STAINING RESULTS

Wet Strength Additives Present	Color of Treated Paper— Procedure I	Procedure II	Procedure III
Melamine resin only	Blue	More intense blue	Same as in II
Urea resin only	Blue	Less intense blue, or colorless	Same as in II (Sample may be defibered)
Protein only	Blue	Blue-intensity variable	Colorless (Sample may be defibered)
None	Colorless*	Colorless	Colorless

*A sheet containing alum and rosin size may show a faint blue coloration.

By inspection of Table I, it is evident that the speed of conducting the test depends upon the number of dyeing procedures that are used. This, in turn, is dependent upon the amount of information already available concerning the sample, and upon the scope of additional information desired. For example, the following specific cases illustrate some of the posible variations in approach:

EXAMPLE A.—If a sheet containing urea resin, melamine resin or a protein is to be differentiated from an untreated sheet, use "Procedure I." A blue coloration indicates that one (or more) of the above types of additive is present.

EXAMPLE B.—If urea resin and melamine resin are known to be the only two additives present in a group of papers (not a combination of the two resins in one sheet), the treatments may be differentiated from one another by performing "Procedure I" on one complete set of samples and then "Procedure II" on another set. The sheets containing melamine resin would show an *increase* in blue color upon performing the second test, while the sheets containing urea resin would show a *decrease* in blue color.

EXAMPLE C.—If melamine resin treated paper is known to be present along with protein treated paper (both materials not present in one sheet), for a quick test perform "Procedure III". The melamine resin treated samples would show an intense blue color whereas the others would possess only a faint blue color, if any. However, should the amount of resin present in a sheet be quite small, only a light blue color would be obtained and doubt raised

as to the meaning of the test. In such case, "Procedure II" should be performed on another set of samples. The presence of melamine resin in a sample would be substantiated if both pieces showed the same intensity of color.

In many cases specific data concerning the samples may not be available, and then, of course, all three dyeing procedures should be applied. It will be noted that the technique as described is specific so far as indicating whether or not melamine resin is present. If, however, melamine resin and some other material, such as urea resin or a protein, are present in the same sheet, the dyeing tests may not show the specific nature of the second constituent. It would then be necessary to rely upon some other type of test to obtain such information.

The "dye test" as described has been applied to a variety of "known" samples, with surprisingly good results to date. In only one case has an apparent discrepancy been observed. This particular sample was a laboratory prepared unbleached kraft sheet containing casein which had been hardened with an excess of formaldehyde. Upon application of dyeing "Procedures II and III" to separate pieces, it was found that contrary to expectation, there was no difference in the intensity of the blue color developed. It is believed that the caustic pretreatment of Procedure III was not adequate for removing the casein in this instance, but that a more severe pretreatment might have done so.

Obviously, the dyeing technique would not be used for testing deeply colored, beater dyed papers. Also, difficulty might be found in testing unbleached kraft papers containing very small amounts of resin.

Xanthydrol Test for Urea and Thiourea

The procedures discussed above have all involved color reactions, resulting from the application of the reagents to the sample as received, or to isolated fractions. As an example of a different type of technique, i.e., derivative formation, let us now consider the xanthydrol test.

Xanthydrol condenses with urea (and thiourea), probably according to the reaction shown in Fig. 8, to give crystalline derivatives with well-defined chemical and optical properties. Under suitable conditions the reaction is quantitative and has been used by Fosse and co-workers (*11*) for the estimation of urea in biological fluids.

Melamine does not interfere since it gives no precipitate with xanthydrol. However, a sheet containing melamine resin will often yield some of the free base (melamine) on hydrolysis, so that the analyst will find it worth while to examine any residues micro-

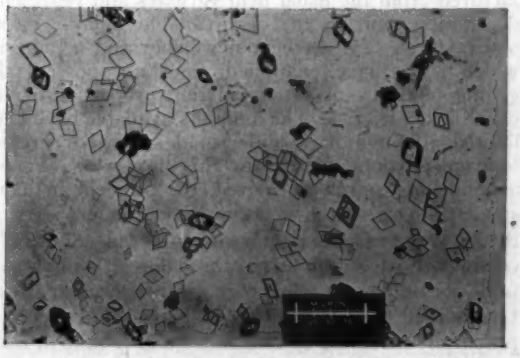

Fig. 6
Melamine as Obtained by Hydrolysis of Salts and Some Methylol Melamines

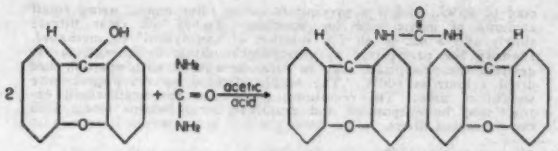

Fig. 8

scopically. Melamine itself is very characteristic (Figs. 6 and 7). The triacetate appears as bladed crystals showing parallel extinction and having a refractive index of 1.455 ± 0.003 parallel to elongation.

Many amides react with xanthydrol to give crystalline derivatives, as reported by Philips and Pitt *(12)*. Such compounds are unlikely to be found in wet strength paper but might conceivably occur in sheets treated with special wetting agents, softeners, or emulsions. Even if present, these compounds cannot be confused with urea because of the characteristic nature of the respective optical properties.

Figures 2 and 4 are photomicrographs of dixanthyl urea and thiourea crystals, respectively. Figures 3 and 5 represent the usual orientation of dixanthyl urea and thiourea, and also diagnostic optical properties determined on these respective habits. Figures 6 and 7 represent the usual orientation of melamine and diagnostic optical properties of this habit. The illustrations are taken from Chapter I of Mattiello's "Protective and Decorative Coatings," Vol. *V*, (*6*) which is to be published shortly.

The success of the test depends on the formation of free urea, making it necessary in the present application to remove the resin from the sheet and to hydrolyze polymers to urea. Ideally, the process should convert all of the resin to urea and then go no further. Actually, however, any hydrolytic process strong enough to break down the resin will also decompose some of the urea so formed. This necessity for compromise prevents use of the method as a quantitative tool.

The detailed technique as worked out in this laboratory is as follows:

Slurry 1 to 2 grams cut paper with 40 ml. glacial acetic acid and 15 ml. water for 0.5 hour just below the boiling point. Filter,

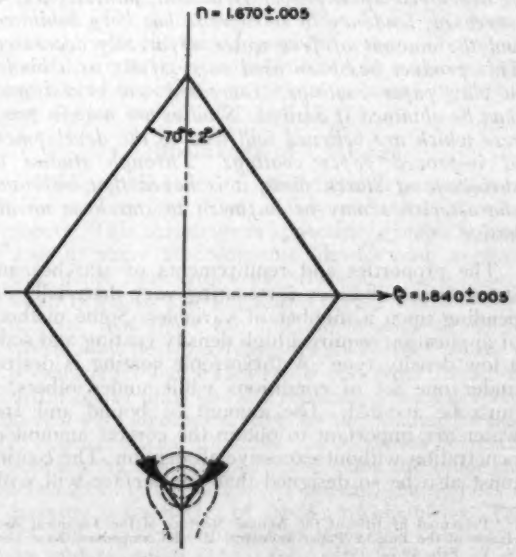

Fig. 7
Diagram Showing Usual Orientation of Melamine

cool to 25°C., and if a precipitate forms filter again, using small amounts of acetic acid for washing. To 45 ml. clear filtrate slowly add 5 ml. of an 8% solution of xanthydrol* in methanol. Identify the precipitate by reference to Figs. 2 through 5. If desired, the precipitate may be filtered, washed with ethanol, and dried 1 hour at 100°C. The weight divided by seven gives the weight of urea. The remaining portion of the acetic acid extract may be evaporated and examined for melamine along with the extracted fibers.

*Eastman No. 1559.

As an alternative extraction method, good results have been obtained by leaching out the urea with boiling water, as follows:

Slurry 2 gram pulp with 750 ml. water, evaporate to 15 ml., filter, add 30 ml. glacial acetic acid and proceed as above.

The xanthydrol test has proved satisfactory for use with a variety of paper products as well as with some textile fabrics and plastics. In an extreme case, urea was successfully identified in a 0.2 gram sample of paper which had been treated with 2% melamine resin in the beater and 2.5% urea resin in the tub. It should be noted that in certain instances it may be necessary to concentrate the solution after the addition of the xanthydrol, in order to facilitate the separation of the crystals. In extreme cases, crystals can be obtained by evaporation almost to dryness, followed by recrystallization from a 60:40 dioxane-water solution.

Remarks

The complementary nature of the various techniques is clearly evident, since no one method or class of methods can furnish a complete answer. Even a collection of procedures such as has been suggested is, at best, a preliminary and incomplete approach to this rather complex problem. It is hoped, however, that the publication of this method of attack will prove to be of some assistance, and will serve to stimulate development of improved methods.

Acknowledgment

The authors wish to acknowledge the contributions of Drs. T. G. Rochow, J. K. Dixon, and W. B. Innes, Messrs. C. H. Benbrook, H. P. Wohnsiedler, C S. Maxwell, Mrs. H. L. Clapp and Miss J. E. Murphy, and also the suggestions and advice of Mr. C. G. Landes in the preparation of the manuscript. Permission of the American Cyanamid Company to publish this material is greatly appreciated.

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Newer Starches for Paper Coating*

By C. C. Kesler[1] and E. T. Hjemstad[2]

Abstract

A new starch-urea resin reaction product has been developed which possesses several desirable characteristics which are not found in the ordinary varieties of starch. Varying degrees of water resistance may be developed upon proper treatment, adhesiveness is increased, tendency to retrograde has been inhibited, and the amount of free water apparently decreased. This product has been used successfully as a binder in clay paper coatings. Increased water resistance may be obtained if desired. Studies are now in progress which are believed will lead to the development of improved paper coatings. Through studies of shrinkage of starch films, it is hoped that improved characteristics may be imparted to starch as an adhesive.

The properties and requirements of starches and starch-base adhesives for coating vary materially depending upon a number of variables. Some methods of application require a high density coating and some a low density type. A thixotropic coating is desired under one set of conditions while under others, it must be avoided. The amount of bound and free water are important to obtain the correct amount of penetration without excessive absorption. The coating must also be so designed that the surface will withstand the conditions encountered in printing. A continuous level surface is needed to insure good contact and uniform spreading of the ink. It may have to produce varying degrees of water resistance. The above, to mention only a few, are requirements that the starch chemist must consider in the manufacture of starches for coating *(1)*. Consequently, consideration must be taken of what starch is, what properties it has that are desirable, and in what way it should be modified or supplemented.

Nature of Starch

Corn starch which shall be considered is manufactured from the usual field varieties and represents the major tonnage that is available today. Waxy maize starch *(2)*, a recent newcomer and a material which some have examined, does not possess the gelling tendency or retrogradation properties of the usual field varieties. The amounts available have been limited although it is understood somewhat greater tonnage is contemplated for this next year. Where a nongelling starch is desired, the problem in using standard corn starch is to modify this property so that it will meet the requirements of an adhesive in coatings. Corn starch as nature makes it, and as man finds it in the grain of corn, is in granular form. Unmodified corn starch as commercially produced is practically insoluble in cold water and if heated, these granules swell and get thick, forming a paste. Obviously, this material does not lend itself as such to do an adhesive job for coatings because of this and

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other reasons which will be discussed subsequently, and it has too great a consistency even in quite low concentrations. This consistency must be modified or reduced to the point where the ratio of adhesive to clay is sufficiently low to give a good working viscosity and still retain a strong bond. There are, of course, a number of ways that the consistency can be reduced but all of them are not equally good in terms of the physical properties needed for machine coating. To mention a few methods which are more or less common knowledge, there are wet acid modification, enzyme modification, oxidation, and torrefaction modification. The question naturally arises why one method should be chosen in preference to another. This requires some thought as to what starch is as it is separated commercially from the other components of corn. It has been shown that rather completely dispersed corn starch in water can be fractionated by the addition of hydrophobic groups to one fraction, making it insoluble, while the other fraction remains dispersed *(3, 4, 6)*. The fractions when separated and studied have different physical and colloidal properties. It is generally believed that the principal fraction is composed of large branched polymers with a smaller fraction composed principally of smaller straight-chain polymers *(5, 7)*. These latter are responsible for the gelling of starch and for its retrogradation and, in some cases, contribute to the difference between starches of different origin. It should be remembered, however, that starch as hydrated in most commercial uses has not been torn apart to any appreciable degree *(8)*. Commercially prepared starches, while not dispersed to the degree that will allow complete fractionation, still possess many properties of the fractionated starch unless some treatment is given to modify them. It is here that the different modification methods are employed. The orthodox or commonly used methods previously mentioned serve to meet many of the needs of coating but as all technical men are aware, the perfect material has yet to be made. New uses and new materials often require a new approach.

Newer Coatings

In this study of coating starches, an attempt has been made to keep in mind the fundamental properties of starch and requirements made of starch and requirements made of it in coatings. A result has been, it is believed, a correlation between good coatings as measured by present standards and the colloidal nature of the adhesive. In studies to produce improved starch adhesives for coatings, the following technique was developed, which is believed to be an improvement. A corn starch which has been modified to make it suitable for coating as measured by standard practice, is reacted with urea-formaldehyde reaction product by cooking the two together in an acid condition to a definite hydration temperature *(9)*. The reaction between the starch and resin forming chemicals will be obvious by the excessive gelling that will be observed. However, if the temperature is maintained, a viscosity of the order of the original starch results. The physical properties are modified in various other ways. The tendency to gell has been inhibited, the cohesiveness has been increased, the free water has been decreased. The results are as if the linear polymers have been branched. The retrogradating fractions are dispersed to a degree that they can no longer be mutually attracted to each other and thereby become insoluble. It will be obvious to those skilled in the coating art that the attainment of the above changes should be quite desirable in allowing for the production of a desirable coating.

TABLE I.—EFFECT OF DRYING TIME ON WATER RESISTANCE OF STARCH-RESIN COATINGS

Composition: Starch, clay, urea-formaldehyde resin					
Time brushed in cold water, min.	10	10	10	10	10
Time dried on 50-watt bulb, min.	1	2	3	5	8
Comparative water resistance *	2.5	25	33	35	38
Maximum temperature of coated, dried bulbs	125° C.				

* These values represent the maximum liquid depth through which a standard illuminated figure remains visible.

TABLE II.—EFFECT OF pH ON WATER RESISTANCE OF STARCH-RESIN COATINGS

Composition: Starch, clay, urea-formaldehyde resin				
Time brushed in cold water, min.	10	10	10	10
Time baked on 50-watt bulbs, min.	5	5	5	5
pH of coating mix	6.7	6.0	5.8	4.5
Comparative water resistance *	12.5	36	40	42
Maximum temperature of coated, dried bulbs	125° C.			

* These values represent the maximum liquid depth through which a standard illuminated figure remains visible.

An exceptionally valuable property of this new starch-resin is the high degree of water resistance which may be developed. By proper control of pH, cooking temperature and time, drying temperature, and concentrations of resin, the amount of water resistance may be varied. Although coatings made with this starch-resin are highly water-resistant, they should not be confused with water-repellent coatings. Water penetrates into the coating as readily as in standard starch-clay types. The particles of clay are, however, bound to the paper firmly even though the coating is wet. Good penetration is necessary for best results in printing.

Evaluating Water Resistance

In order to determine the effectiveness of the formulations, it was necessary to devise a simple and rapid method of evaluating comparative water resistance. Several standard methods were tried and the following method devised by the authors appears to give quite consistent results. A 50-watt, 110-volt electric light bulb is dipped in the coating mix, inverted, and dried. When dry, the bulb is attached to a current outlet and lit for a definite interval. The coated, dried bulb will reach a maximum temperature of 125°C. The bulb is then attached to a variable speed electric motor by means of a Gooch crucible adaptor and rotated against a circular brush immersed in 300 ml. of clear, cold water for a definite interval. The turbidity of the water is measured in a nephelometer. The water resistance developed will vary inversely with the turbidity of the water. This method must, of course, be supplemented by additional tests on coated paper. Some results obtained by this test are shown in Tables I and II.

Shrinkage of Coatings

When a thin layer of cooked starch paste is spread on a surface and dried, a very noticeable shrinkage occurs. This shrinkage is apparently greater in starch than in many other organic film-forming materials. The dried films are very brittle and easily shatter when dried to low humidities. This would seem to indicate that there are internal strains in the film which may be caused by this shrinkage. From experience in other adhesives it has been found that shrinkage of films and the resulting strains developed have a very significant effect on the bonding strength. It is believed that there may be a definite correlation between the shrinkage of starch films and other characteristics of the starch. At present, the authors are carrying out a series of studies of shrinkage. Table III and Fig. 2 show some of the results obtained in the initial studies.

In order to determine the extent of shrinkage of starch films under varying conditions, a new tech-

TABLE III.—SHRINKAGE OF STARCH FILMS ON DRYING AT DIFFERENT HUMIDITIES

Type of Starch	Thin-boiling Acid-modified	Starch-Resin	British Gum	British-gum Resin
Cooking concentration, %	15	15	20	20
Cooking temperature, °F.	190	190	190	190
Cooking time, min.	10	10	10	10
Weight of dry film, g.....	1.30	1.25	1.32	1.36
Area of wet film, sq. cm.....	244	244	244	244
Shrinkage at 85% R.H., sq. cm..	82	41	52	37
Shrinkage at 71% R.H., sq. cm..	101	53	69	48
Shrinkage at 57% R.H., sq. cm..	111	71	81	59
Shrinkage at 35% R.H., sq. cm..	122	78	93	68

nique was developed in which the drying starch film is allowed to shrink its maximum without encountering a great enough resistance to affect its shrinkage. Wrinkling of the film is also avoided.

Gas-Bag Method For Measuring Shrinkage of Films

An Orsat gas bag, 2- by 4-inches when deflated, is attached to a combination water reservoir and manometer as shown in Fig. 1. Air is pumped in an air inlet at the top of the reservoir until a water column extends to the top of the manometer. The height of this water column will determine the extent to which the balloon is inflated. If the entire system is maintained at constant temperature and pressure, anything forcing a contraction of the balloon will cause water to be displaced from the reservoir through the top of the manometer, while the pressure inside the balloon will vary only slightly. If a film is cast on an expanded balloon and allowed to dry, this system will permit the film to shrink its maximum without encountering any appreciable resistance, while at the same time the rubber will contract to accommodate this shrinkage. The amount of shrinkage can be automatically recorded by catching the displaced water in a graduated cylinder, the number of cubic centimeters of water displaced being proportional to the decrease in area of the balloon, according to the relationship:

$$\log \Delta A = 0.6845 + 2/3 \log \Delta V$$

where ΔA = decrease in area of a sphere
ΔV = decrease in volume of a sphere

The procedure used for casting films and attaching the gas bag follows:

Procedure.—The clean and dry balloon is attached to the water reservoir and air pumped in the air-inlet until water extends to the top of the manometer. A pinch clamp is placed across the air inlet and across the rubber tubing leading to the balloon. The balloon is then removed and dipped into the solution containing the film forming material, allowed to drain, attached to the reservoir again, and the pinch clamp removed. The film is allowed to dry at a known, constant humidity and the amount of water displaced is measured when no further shrinkage occurs at that humidity. Constant temperature must be maintained throughout the whole operation. In making comparative studies it is necessary to apply films of approximately the same weight. This can be accomplished by a quick weighing of the balloon and wet film immediately after dipping in the solution. Multiplying this weight by the per cent concentration will give the approximate dry weight of film. Several starches and starch combinations were cooked and films cast on the Orsat gas bags. These films were dried at various humidities as given in Table III.

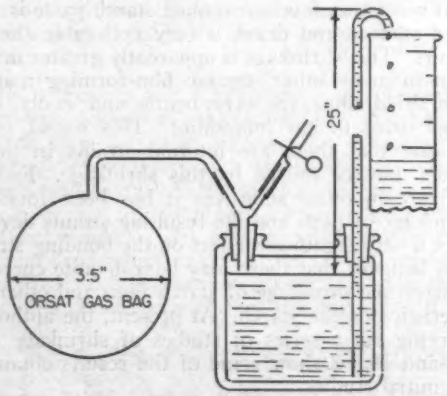

FIG. 1
Apparatus for Measuring Free Shrinkage of Films

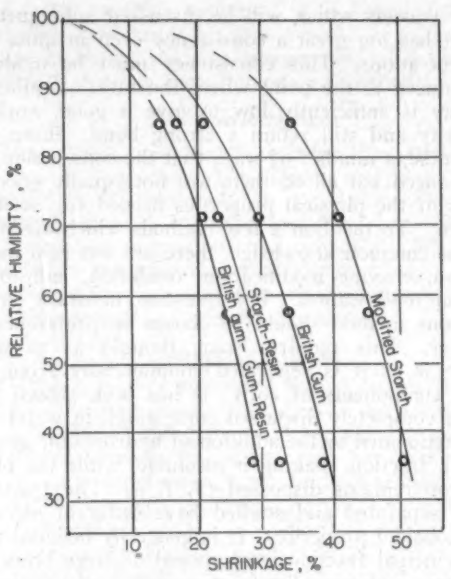

FIG. 2
Shrinkage of Starch Films at Different Humidities

Conclusions

An examination of the above data will show several significant facts. First, that the amount of shrinkage of a film containing starch will depend on the moisture content of the film. Invariably a greatly increased shrinkage was obtained with lowered humidity. Second, it is possible to decrease the shrinkage of a starch film by reacting the starch with resins.

This lowered shrinkage may be the result of structural changes which are evidenced also by the loss of tendency to gel and retrograde. This, together with increased water resistance when desired, may be obtained by the use of starch-resins or an adhesive in paper coatings.

Experimental evidence indicates that starch films have a high tensile strength. If the tendency to develop internal strains and resultant brittleness at low humidities be eliminated the application and efficiency of starch sizings and coatings is materially increased.

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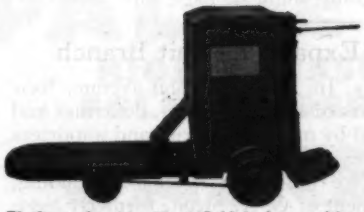
INDUSTRIAL ELECTRIC TRUCK CO.

INCORPORATED

Phelps, New York



Platform size 24 x 42 x 11" high, low position; 15" high when elevated. Capacity: 2000, 3000 and 4000 pounds.

Capacity 2000 lbs. on forks 30" long. Truck turns from a 5' aisle into an intersecting aisle of 5'.

Weight of 4000 lbs. capacity—2350, without battery. Truck turns from a 5' 4" aisle into an intersecting aisle of 4'.

Platform 24" wide, 53" long and 11" high, low position. Capacity 2000, 3000 and 4000 pounds.

The Wright-Hibbard Telescoping high lift truck is designed to operate in the most congested areas of factories and warehouses. The exceptionally narrow width and short overall length found in other Wright-Hibbard trucks are retained in this model.

Platform 24" wide, 42" long and 9" high, low position. Weight of 4000 lb. capacity—2900 without battery.

New York Paper and Pulp Market Review

Paper Supply For Civilian Use Is Expected To Reach Lowest Level In June With Later Supply Prospects Uncertain—Pulp Shortages Critical — Mill Demand For Waste Paper Heavy — Rags Active.

Office of the PAPER TRADE JOURNAL,
Wednesday, April 18, 1945.

Paper supply is quite widely expected in the market to continue tight for civilian consumption through the current quarter. It is also generally expected that substantial improvement in the supply situation will come when hostilities cease in Europe. The low point in the civilian paper situation is likely to be experienced in June.

Paper production for the week ended April 7 was estimated at 86.8%, compared with 86.2% for 1944, with 89.9% for 1943, with 98.9% for 1942, and with 95.0% for the corresponding week in 1941.

Paperboard production for the week ended April 7 was estimated at 93.0%, compared with 94.0% for 1944, with 95.0% for 1943, with 93.0% for 1942, and with 85.0% for the corresponding week in 1941.

The WPB states in a late report that boxboard output has been increased above the monthly average production last year but more is needed. No real shortage exists, the report states, in folding and set-up boxes. If more containerboard is required for shipping containers, it must be produced at the expense of decreased set-up boxboard output. Requirements for fiber shipping containers, including V-boxes, have increased so substantially that less boxboard may be produced to increase the tonnage of liner board. Boxboard production amounting to 50% of a mill's production is required under Boxboard Order M-378, to meet military requirements.

Wood Pulp

Wood pulp shortages are so critical that allocations for the current quarter will result in reductions in the output of almost all paper items. The only exceptions are in kraft liners for explosives and shipping containers.

Rags

Papermaking rags are in active demand, with mill buying steady and in good volume. Prices are strong at ceiling levels. The Department of Commerce reports that total 1944 consumption in the paper industry was 427,837 tons of new and old rags, compared with 425,910 tons in 1943.

The old cotton rag market is active. Prices are firm at ceiling levels.

Old Rope and Bagging

Demand for old Manila rope and some other fibers continues active this week. No change of importance has been reported in supply or in quotations. Prices are firm at ceilings.

With supplies reported as light, improvement is expected to result in more active trading in scrap bagging in the near future. Prices continue soft at this date and unchanged.

Old Waste Paper

Mill demand for paper stock continues urgent and all grades are in heavy demand at this date. Prices are strong at ceiling levels.

The Department of Commerce reports that total consumption of waste paper by paper and paperboard mills in 1944 was 471,478 tons, compared with 367,854 tons in 1943, an increase of 7.4%.

The OPA reported April 17, that all shipments of commercially packed waste paper must now be accompanied by a manifest, giving particulars of the shipment and more complete invoices must be supplied. These new requirements are effective April 21, 1945 and will not apply to loose waste paper, such as collected by volunteer workers, but will apply if such paper stock is later commercially packed and sold. This directive is covered in Amendment No. 11 to Maximum Price Regulation No. 30, Waste Paper.

Twine

Demand for twine is reported active in most available grades. No change in the market supply situation has been reported at this date. Prices continue firm and unchanged this week.

Fire Damages Finch, Pruyn Yards

[FROM OUR REGULAR CORRESPONDENT]

GLENS FALLS, N. Y., April 16, 1945—The yards of Finch, Pruyn & Co. were visited by fire this week which destroyed a large quantity of pulpwood and caused damage estimated at about $8,000. The building destroyed was formerly used by the firm for the storage of wood chips. The origin of the blaze has not been determined but an official expressed the belief that a grass fire may have spread to the yard. Following discovery of the fire it spread quickly to the end of the old sawmill, a large concrete and frame structure. The sprinkler system in that structure operated promptly and only slight damage was caused.

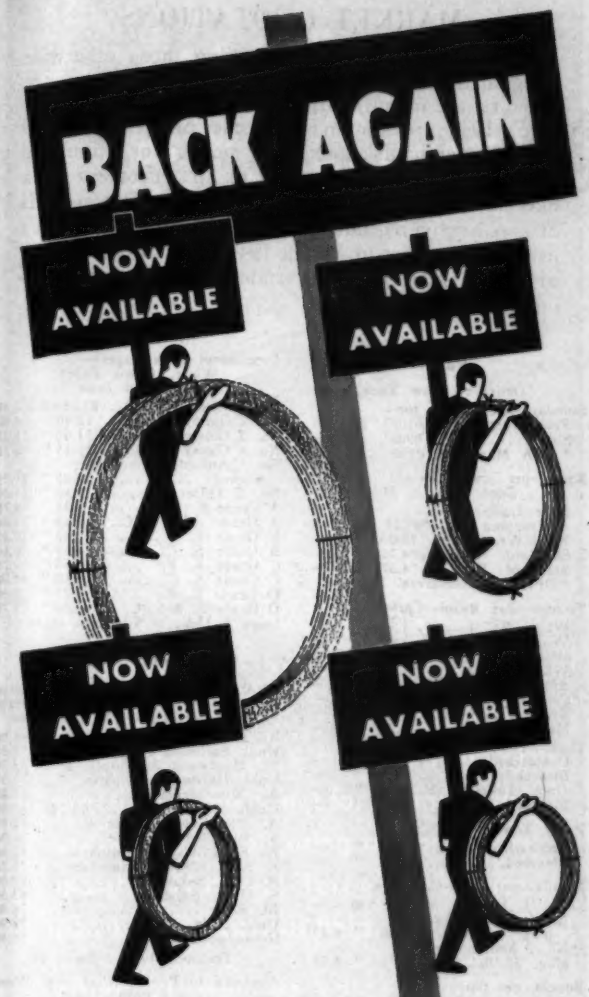
Stein, Hall Expand Detroit Branch

Stein, Hall & Co., Inc., 285 Madison avenue, New York, manufacturers of starches, gums, dextrines and other materials used by many industries and importers of burlap and other commodities, has expanded its Detroit branch office at 705 Stephenson Building, under the management of G. N. Streit, formerly associated with the Chicago office.

Mr. Streit's staff includes M. F. Hunt, covering Stein-Hall's general line; R. Swint, specializing in products for the food industry; E. B. Taylor, handling general adhesives and paper mill materials; and H. J. Jones, contacting manufacturers of corrugated board in the interests of the Stein-Hall Starch Process.

J. A. Cunningham to Be Vice Pres.

The Container Corporation of America announces that James A. Cunningham, for years active in important positions in the utility field, is joining its organization in the capacity of vice president in charge of financial and various administrative matters. He will be located in the executive offices of the corporation at 111 W. Washington Street, Chicago, Ill.



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• A COLUMBIAN COLLOID •

Especially created to overcome dispersion problems, Paris 2 is the easiest wetting black in the paper field.

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MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, April 18, 1945.

BLANC FIXE—Quotations on blanc fixe continue unchanged. Demand is reported moderate. The pulp is currently quoted at $40 per ton, in barrels, at works; the powder is quoted at $60 per ton, f.o.b. works.

BLEACHING POWDER—Current demand is heavy. Supply situation is reported favorable at this date. Quotations continue unchanged. Prices on bleaching powder range from $2.50 to $3.10 per 100 pounds, in drums, car lots, at works.

CASEIN—OPA maximum prices on processed acid-precipitated casein are as follows: 10,000 pounds or more, 24 cents per pound; 2,000 pounds, 24¼ cents per pound; less than 2,000 pounds, 24¾ cents per pound, f.o.b. shipping point.

CAUSTIC SODA—Demand continues very heavy. Production high but below current needs. Export demand unsatisfied. Boxcar shortage delays shipments. Solid caustic soda is quoted at $2.30 per 100 pounds; flaked and ground is quoted at $2.70 per 100 pounds; all in drums, car lots, at works.

CHINA CLAY—Quotations on china clay are unchanged. Current demand is reported fair. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay is quoted at from $12 to $22 per ton, at mine. Imported clay is quoted at from $13 to $25 per long ton, ship side.

CHLORINE—Demand heavy with essential requirements met. Supply situation is reported tighter at this date. Quotations are unchanged. Chlorine is currently quoted at $1.75 per 100 pounds, in single unit tank cars, f.o.b. works.

ROSIN—The rosin market reports no change in ceiling prices on any grade this week. "G" gum rosin is currently quoted at $5.79 per 100 pounds; in barrels, at Savannah. "FF" rosin is currently quoted at $5.75 per 100 pounds in barrels, at New York. Seventy per cent gum rosin size is currently quoted at $6.06 per 100 pounds, f.o.b. works.

SALT CAKE—Prices on salt cake are reported unchanged for the current week. Consumption is reported moderate at this date. Domestic salt cake is quoted at $15 per ton, in bulk. Chrome salt cake is quoted at $16 per ton. All prices in car lots, f.o.b. shipping point.

SODA ASH—Heavy demand continues for all-over requirements and market is tight. Demand above output this week. Quotations continue unchanged. Current prices, car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH — Current corn receipts and shipments delayed by car shortage. Prices reported less firm at this date. Starch prices continue unchanged. The pearl grade is quoted at $3.72 per 100 pounds; powdered starch at $3.83 per 100 pounds; all prices in bags, car lots, f.o.b. Chicago.

SULPHATE OF ALUMINA — Demand reported good. Quotations continue unchanged. The commercial grades are quoted at from $1.15 to $1.25 per 100 pounds, in bags, car lots, f.o.b. works. The iron free is currently quoted at $1.85 per 100 pounds, in bags, at works.

SULPHUR—Quotations on sulphur continue to conform to prevailing market prices. Demand active. Annual contracts are quoted at $16 per long ton, f.o.b. mines; the price at Gulf Ports is $17.50 per long ton.

TALC—Prices on talc continue unchanged. Demand good. Domestic grades are currently quoted at from $16 to $21 per ton at mines; Canadian at $24 per ton. All prices in car lots. Consumption in 1945 may be 340,000 tons.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

Standard News, per ton—

Roll, contract	*$61.00	@	—
Sheets	69.00	@	—

* OPA Maximum Price.

Kraft—per cwt.—Carload Quantities Zone A, f.o.b. Mill

Superstandard Wrapping	*$5.25	@	—
No. 1 Wrapping	*5.00	"	—
Standard Wrapping	*4.75	"	—
Standard Bag	*4.375	"	—

* OPA Manufacturers' Prices.

Tissues—Per Ream—Carlots

White No. 1	1.12½	"	—
White No. 1 M. G.	1.10	"	—
White No. 1½	1.00	"	—
White No. 2	.90	"	—
Anti-Tarnish M.F.	1.20	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—

Toilet—1 M. Sheets—Per Case

Unbleached	4.25	"	—
Bleached	5.70	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—

Paper Towels, Per Case—

Unbleached, Jr.	2.20	"	—
Bleached, Jr.	3.20	"	—

Manila—per cwt.—C. l. f. a.

No. 1 Jute	11.25	@	—
No. 1 Manila Wrapping, 35 lb.	6.00	"	6.25
No. 2 Manila Wrapping, 35 lb.	5.75	"	6.00

Boards, per ton—

News	*50.00	@	—
Chip	*50.00	"	—
Sgl. Mla. Lt. Chip	*62.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*63.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers
100% Rag Ext. No. 1	$39.10 @	$46.00	$40.25 @ $47.25
100% Rag	32.20 "	37.75	33.35 " 39.25
85% Rag	.... "	....	29.90 " 35.00
75% Rag	23.00 "	27.00	24.15 " 28.25
65% Rag	.... "	....	22.80 " 27.75
50% Rag	18.70 "	22.75	19.90 " 24.25
25% Rag	16.40 "	20.00	17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers
No. 1	$10.55 @	$12.75	$11.70 @ $14.25
No. 2	9.65 "	11.75	10.80 " 13.25
No. 3	9.20 "	11.25	10.35 " 12.50
No. 4	8.90 "	10.75	10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper, Delivered in Zone 1:

No. 1 Glossy Coated	$13.65 @		$15.50
No. 2 Glossy Coated	12.40 "		14.00
No. 3 Glossy Coated	11.60 "		13.25
No. 4 Glossy Coated	11.15 "		12.75
No. 1 Antique (watermarked)	10.25 "		11.75
No. 2 Offset	9.60 "		11.00
A Grade E. F.	9.35 "		10.75
A Grade S. & S. C.	9.60 "		11.00
B Grade E. F.	8.85 "		10.25
B Grade S. C.	9.10 "		10.50
C Grade E. F.	8.55 "		9.75
C Grade S. C.	8.80 "		10.00
D Grade E. F.	8.25 "		9.50
D Grade S. & S. C.	8.50 "		9.75

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight Not Exceeding OPA Allowances.

Bl. Softwood Sulphite	$86.00
Unbl. Softwood Sulphite	74.00
Bl. Hardwood Sulphite	83.50
Unbl. Hardwood Sulphite	71.50
Bl. Mitscherlich	81.00
Unbl. Mitscherlich .. 72.00 @	82.00
N. Bleached Sulphate	86.00
S. Bleached Sulphate	79.00
N. Semi-Bleached Sulphate	82.00
S. Semi Bleached Sulphate	75.00
N. Unbl. Sulphate	73.00
S. Unbl. Sulphate	63.50
Bl. Soda	76.00
Unbl. Soda	73.00
Groundwood	50.00

Transportation Allowances

Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area)	10.50
West Coast (out area)	16.50

	50%-80% Air Dry Weight
Northeast	11.50
Lake Central	11.50
Southern	14.00
West Coast (in area)	9.50
West Coast (out area)	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area)	7.50
West Coast (out area)	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.50	@	7.25*
Silesias No. 1	—	"	5.75*
New Unbleached	6.75	"	7.50*
Blue Overall	—	"	5.50*
Fancy	—	"	3.50*
Washables	—	"	3.00*
Bleached Khaki Cuttings	—	"	4.25*
Unbleached Khaki Cuttings	—	"	3.50*

*OPA Maximum Prices

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Whether you face the problem of creating a new sheet for a particular purpose or duplicating a "sample to match", National Technical Service can be of practical help.

Fiber as well as color-analysis, suggesting paper-stock composition as well as dye formula, are the everyday work of National Technical Service. We invite your inquiry for particular help or general consultation.

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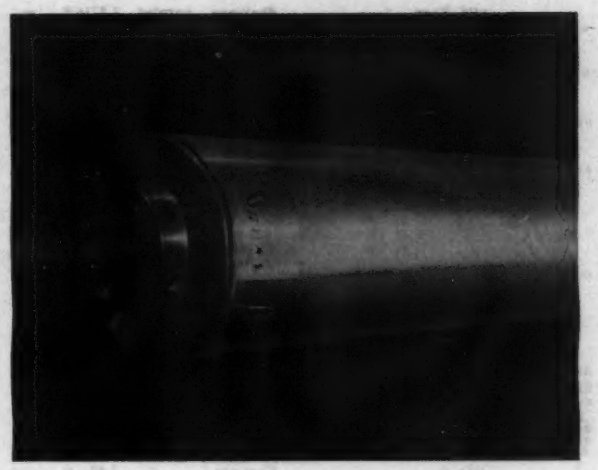

This *Metal* Core Distinguishes JENKINS BRUSHES *from all others—*

The cores of all Jenkins Cylindrical brushes for the paper industry are made from tubular aluminum or cold drawn steel. They cannot sag, split, or get out of alignment.

Bristle or nylon fiber is wound on these metal cores with flat copper or steel wire by a patented process. Cores can be refilled at our factory as often as you wish when the nylon or bristle is worn.

The Heart of the Brush
Controls Its Efficiency
THE COLD DRAWN STEEL OR ALUMINUM HEART OF
JENKINS CYLINDER BRUSHES
ASSURES STRENGTH, RIGIDITY, BALANCE AND
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Send for this Free booklet before you buy brushes of the ordinary kinds.

M. W. JENKINS' SONS, INC.

CEDAR GROVE, ESSEX COUNTY, NEW JERSEY

We Manufacture all types of Industrial Brushes.

Old Rags

White, No. 1—
Repacked ..... *1.80 @ —
Miscellaneous .... *1.90 " —
White, No. 2—
Repacked ..... *2.00 " —
Miscellaneous ... *2.05 " —
Third and Blues—
Repacked ..... *2.20 " —
Miscellaneous .... *1.80 " —
Roofing Rags—
No. 1 ..... *1.35 " —
No. 2 ..... *1.45 " —
No. 1 (bagging).. *1.25 " —
No. 4 ..... *1.35 " —
No. 1A ..... *1.30 " —
Old Manila Rope.. 5.75 " —
OPA Maximum Prices.

Foreign Rags

All Prices nominal

New Rags

New Dark Cuttings.. 2.25 @ 2.40
New Mixed Cuttings. 2.00 " 2.20
New Light Silesias.. 5.50 " 5.75
Light Flannelettes... 5.50 " 5.75
New White Cuttings. 7.00 " 7.50
New Light Oxfords. 4.00 " 4.50
New Light Prints... 3.00 " 3.25

Old Rags

No. 1 White Linens. 7.50 " 8.50
No. 2 White Linens. 6.50 " 7.50
No. 3 White Linens. 4.50 " —
No. 4 White Linens. 2.25 " 3.25
No. 1 White Cotton. 4.25 " 4.75
No. 2 White Cotton. 3.25 " 3.75
No. 3 White Cotton. 2.50 " 3.00
No. 4 White Cotton. 1.90 " 2.20
Extra Light Prints.. 2.00 " 2.40
Ord. Light Prints... 1.75 " 2.15
Med. Light Prints... 1.55 " 1.95
Dutch Blue Cottons. 2.25 " 2.50
French Blue Linens. 3.00 " —
Checks and Blues... 2.00 " —
Linsey Garments.... 1.90 " 2.00
Dark Cottons..... 1.50 " 1.60
Old Shopperies..... 1.30 " 1.45
New Shopperies..... 1.45 " 1.50
French Blues..... 2.25 " 2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—
Foreign .....Nominal
Domestic ..... 4.25 @ 4.35
Wool Tares, light.... 4.25 " 4.50
Wool Tares heavy... 4.50 " 5.00
Bright Bagging..... 4.50 " 4.85
Manila Rope—
Foreign ..... — " —
Domestic ..... *3.75 " —
Jute Threads..... 3.50 " —
No. 1 Sisal Strings.. *4.00 " —
Mixed Strings..... 2.00 " —
* OPA Maximum Price.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices, Baled

No. 1 Hard White Envelope Cuts, one cut ..... 3.37½ @ —
No. 1 Hard White Envelope Cuts.... 3.12½ " —
No. 1 Hard White Shavings, unruled. 2.87½ " —
No. 1 Hard White Shavings, ruled... 2.30 " —
Soft White Shavings, one cut..... 2.87½ " —
No. 1 Soft White Shavings ..... 2.50 " —
Soft White Shavings, Misc. ..... 2.15 " —
No. 1 Fly Leaf Shavings ..... 1.67½ " —
No. 2 Fly Leaf Shavings ..... 1.12½ " —
No. 1 Groundwood Fly Leaf Shavings 1.25 " —
No. 2 Mixed Groundwood Fly Leaf Shavings ..... .90 " —
Mixed Colored Shavings ..... .75 " —
Mixed Groundwood Colored Shavings.. .90 " —
Overissue Magazines ..... 1.67½ " —
No. 1 Heavy Books & Magazines ..... 1.92½ " —
Mixed Books..... 1.10 " —
No. 1 White Ledger.. 2.30 " —
No. 2 Mixed Ledger, colored ..... 2.00 " —
New Manila Envelope Cuttings, one cut.. 2.87½ " —
New Manila Envelope Cuttings ..... 2.65 " —
Extra Manilas..... 1.95 " —
Mixed Kraft, Env. & Bag Cuttings..... 2.75 " —
Kraft Envelope Cuttings ..... 3.25 " —
Triple Sorted, No. 1 Brown Soft Kraft. 2.50 " —
New 100% Kraft Corrugated Cuttings.. 2.35 " —
No. 1 Assorted Old Kraft ..... 1.75 " —
New Jute Corrugated Cuttings ..... .90 " —
Old 100% Kraft Corrugated Containers 1.75 " —
Old Corrugated Containers ..... 1.40 " —
Box Board Cuttings. .72½ " —
White Blank News.. 1.65 " —
Overissue News..... 1.10 " —
No. 1 News..... 1.00 " —
No. 1 Mixed Paper... .95 " —
Old Corrugated Containers ..... .82½ " —
Mill Wrappers..... 1.10 " —

Twines

All Prices Nominal

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—
India ..... .21 @ —
White Hemp..... .21 " —
Fine Polished—
Fine India..... .26 " —
Unpolished—
Box ..... .17½ " —
Paper Makers..... .17 " —
Tube Rope..... .15 " —
Wall Paper..... .20½ " —
Wrapping ..... .23 " —
Soft Fiber Rope... .19 " —
Cotton ..... .23 " —

(Hard Fiber)

Medium Java..... .18 " —
Mex. Sisal..... .16 " —
Manila ..... — " —

PHILADELPHIA

Domestic Rags (New)

(Prices to Mill.)

Shirt Cuttings—
New White No. 1..... .07¼
New White No. 2..... .05¼
Light Silesias..... .05¼
Black Silesias, soft..... .03½
New Unbleached ..... .07½
Washable Prints ..... .04¼
Washable No. 1..... .03
Blue Overall..... .05½
Cottons—According to grades—
Washable shredding ..... .01¼
Fancy Percales ..... .04¼
New Black Soft ..... .03½
Khaki Cuttings—
Unbleachable Cotton Cuttings .03½
Bleachable Cotton Cuttings.. .04¼
Men's Corduroy ..... .02½
Ladies' Corduroy ..... .01
Cottonades ..... .03¼

Domestic Rags (Old)

White No. 1—Repacked ..... 3.80 " —
Miscellaneous No. 1. 3.30 " —
Miscellaneous No. 2. 2.65 " —
White No. 4 Repacked ..... 3.90 " —
Thirds and Blues—
Miscellaneous .... 1.80 " —
Repacked ..... 2.30 " —
Black Stockings—
(Export) ..... Nominal
Roofing Stock—
Foreign No. 1....Nominal
Domestic No. 1... 1.55 " —
Domestic No. 2.... 1.45 " —
Roofing Bagging.. 1.35 " —
Old Manila Rope... 5.75 " —

Bagging

(F. o. b. Phila.)

Gunny No. 1—
Foreign .....Nominal
Domestic ..... 3.00 " 3.50
No. 1 Clean bright—
Sisal Strings ..... .84
No. 2 Clean bright—
Sisal Strings ..... .80
Sisal Jute ..... .82½ " .01½
Scrap—
No. 1..... 3.25 " 3.30
No. 2..... 1.75 " 1.80
Wool Tares ... 4.00 " 4.25
New Burlap ..... 3.00 " 4.00
New Burlap Cuttings 3.75 " 4.00

Old Papers

(F. o. b. Phila)

OPA Maximum Prices, Baled

No. 1 Hard White Envelope Cuts, one cut ..... 3.37½ " —
No. 1 Hard White Shavings, unruled.. 2.87½ " —
Soft White Shavings one cut..... 2.50 " —
White Blank News 6 " —
Soft White Shavings

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices, Baled

No. 1 Hard White Shavings, unruled. 2.87½ @ —
No. 1 Hard White Shavings, ruled.... 2.50 " —
Soft White Shavings, Misc. ..... 2.15 " —
No. 1 Fly Leaf Shavings ..... 1.67½ " —
No. 2 Fly Leaf Shavings ..... 1.12½ " —
No. 1 Groundwood Fly Leaf Shavings 1.25 " —
No. 2 Groundwood Fly Leaf Shavings .90 " —
Mixed Colored Shavings ..... .75 " —
New Manila Envelope Cuts, one cut..... 2.87½ " —
Hard White Envelope Cuts, one cut..... 3.37½ " —
Triple Sorted No. 1 Brown Soft Kraft. 2.50 " —
Mixed Kraft Env. & Bag Cuttings..... 2.75 " —
Kraft Envelope Cuttings ..... 3.25 " —
No. 1 Heavy Books & Magazines..... 1.92½ " —
New Manila Envelope Cuts, one cut..... 2.87½ " —
New Manila Envelope Cuttings ..... 2.65 " —
White and Colored Tabulating Cards.. 2.25 " —
Ground Wood Tabulating Cards..... 1.35 " —
White Blank News.. 1.65 " —
No. 1 Assorted Old Kraft ..... 1.75 " —
No. 1 Mixed Paper... .95 " —
Overissue News..... 1.10 " —
Box Board Cuttings. .72½ " —
New Corrugated Cuttings, Kraft..... 2.25 " —
Old 100% Kraft Corrugated Containers 1.75 " —
Old Corrugated Containers ..... 1.40 " —
Jute Corrugated Cuttings ..... 1.07½ " —

Bagging

(F. o. b. Boston)

Gunny Bagging—
Foreign .....(nominal)
Domestic ..... — @ 2.50
Sisal Rope No. 1.... *4.75 "
Sisal Rope No. 2.... *4.25 " —
Mixed Rope ..... — " 1.55
Transmission Rope—
Foreign .....(nominal)
Domestic ..... 2.75 " 3.00
Manila Rope
Foreign .....(nominal)
Domestic ..... 5.75 " —
Soft Jute Rope..... 5.25 " —
Jute Car Threads 3.00 " 4.50
Bleachery Burlap.... 8.50 " 9.00
Scrap Burlap—
Foreign .....(nominal)
Domestic ..... — " 3.00
South American ... — " 3.25

Wool Tares—
Foreign .....(nominal)
Domestic ..... 4.25 " —
Aust. Wool Pouches.. 3.25 " 3.50
New Zealand Wool Pouches ..... — " 3.50
New Burlap Cuttings 4.75 " 5.00
Heavy Baling Bagging 4.00 " 4.25
Paper Mill Bagging.. 2.50 " 3.00
No. 2 Roofing Bagging 1.35 " —
* OPA Maximum Price.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—
New Light Prints. .04½ @ 04½
Fancy Percales.... .04¼ " .04½
New White No 1. .06¼ " 6
New Light Flannelettes ..... .05½ " 05½
Canton Flannels, Bleached ..... .06 " 06½
Underwear Cutters, Bleached ..... .06¼ " 06½
Underwear Cutters, Unbleached ..... .05¼ " 05½
Silesias No. 1..... .06 " .06½
New Black Silesias.. .03 " .03½
Red Cotton Cuttings .03½ " 04
Soft Unbleached ... .06½ " 06½
Blue Cheviots .... .05½ " 06
Fancy ..... .02¼ " —
Washable ..... .02¼ " —
Khaki Cuttings .... .02¼ " 03
O. D. Khaki..... .03½ " 03½
Corduroy ..... .03¼ " 03½
New Canvas ..... .06¼ " 06½
B. V. D. Cuttings... .06¼ " 06½

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—
Repacked .. .... 3.80 @ —
Miscellaneous .... 3.30 " —
White No. 2—
Miscellaneous .... 2.65 " —
Flows and Blues, Repacked ..... 2.20 " —
Old Blue Overalls... 2.25 " 4.00
Thirds and Blues Repacked ..... 2.30 " —
Miscellaneous ..... 1.80 " —
Black Stockings .. 3.50 " 4.00
Roofing Stock—
No. 1 ..... 1.55 " —
No. 2 ..... 1.45 " —
No. 3 ..... 1.35 " —
No. 4 ..... 1.35 " —
No. 5, Quality A 1.35 " —
Quality B. 1.20 " —
Quality C.. .95 " —
* Old Manila Rope.. 5.75 " —
* OPA Maximum Prices

Foreign Rags

(F. o. b Boston)

Canvas .....(nominal)
Dark Cottons .....(nominal)
Dutch Blues .....(nominal)
New Checks and Blues..(nominal)
Old Fustians .....(nominal)
Old Linsey Garments....(nominal)
New Silesias .....(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices, Baled

Shavings—
No. 1 Hard White Envelope Cuts, one cut ..... 3.37½ " —
No. 1 Hard White Shavings, unruled. 2.87½ " —
No. 1 Soft White Shavings ..... 2.50 " —
No. 1 White Ledger.. 2.30 " —
No. 1 Heavy Books & Magazines..... 1.92½ " —
White Blank News.. 1.65 " —
Mixed Kraft Env. & Bag Cuttings... 2.75 " —
No. 1 Assorted Old Kraft ..... 1.75 " —
Overissue News..... 1.10 " —
No. 1 News..... 1.00 " —
No. 1 Mixed Paper... .95 " —
No. 1 Roofing Rags. 1.35 " —
No. 1 Roofing Bags. 1.45 " —

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BRIDGEPORT, CONN.

INTERSTATE CORDAGE & PAPER CO.
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CHARLES F. HUBBS & COMPANY
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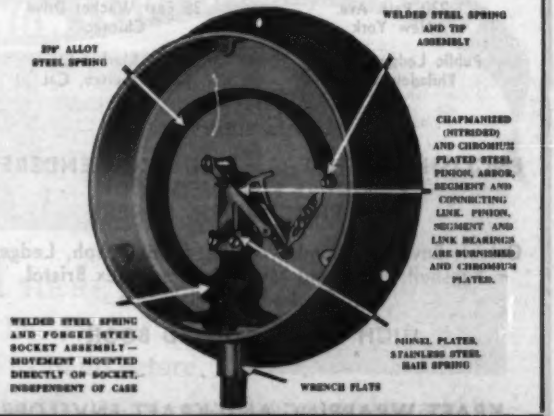
The sectional view of the Model P Gauge, below, shows some of the reasons why. Write for Bulletin 229-3 containing detailed information on special models for all types of service. **The Foxboro Company, 114 Neponset Ave., Foxboro, Mass., U. S. A.**


WELDED STEEL SPRING AND TIP ASSEMBLY
17-7 ALLOY STEEL SPRING
CHAPMANIZED (NITRIDED) AND CHROMIUM PLATED STEEL PINION, ARBOR, SEGMENT AND CONNECTING LINK. PINION, SEGMENT AND LINK BEARINGS ARE BURNISHED AND CHROMIUM PLATED.
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MILLS:

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Keep 'Em Rolling Faster with Magnus Slime Remover

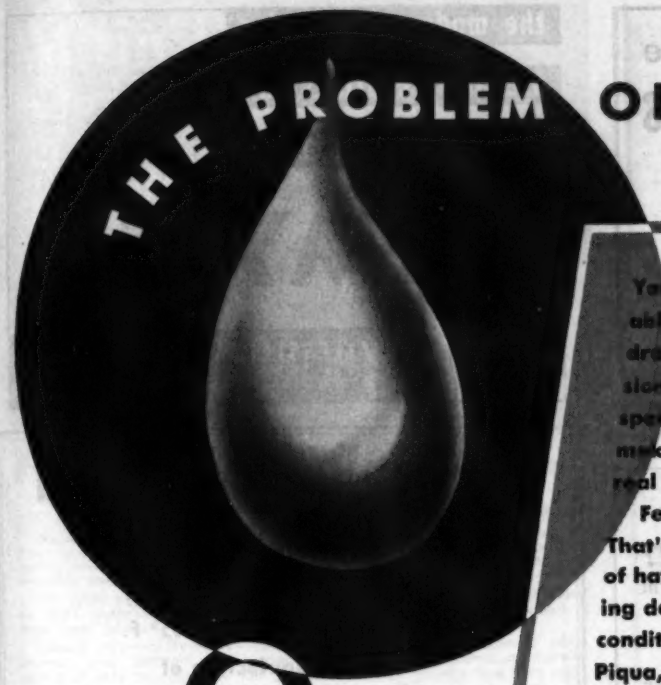
You can't afford the wasted stock and the shut-downs caused by slime in these days of critical paper shortage. Nor can you afford the time to clean up slime manually.

Magnus Slime Remover involves no manual cleaning operations. It loosens and disperses slime deposits and inhibits slime formation by killing the bacteria and micro-organisms which cause it. Put through the system from the beater to the end, and followed by a thorough flush-through with water, you can quickly and economically clear your machines of slime. Ask for complete data.

MAGNUS CHEMICAL CO. 24 SOUTH AVENUE, GARWOOD, N. J.

Magnus Paper Mill Cleaners

THE PROBLEM OF THE DROPLET



You who have never designed a felt probably don't realize the difficulties a simple drop of water can present. Surface tension, temperature, felt porosity, machine speed, pressure . . . all of these and more make the problem of water removal a real scientific puzzler.

Felt manufacture, therefore, is an art. That's why we point out the advantage of having a felt expert suggest felt clothing designed for your particular machine conditions. THE ORR FELT & BLANKET CO., Piqua, Ohio.

ORR FELTS

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ON SHORTEST POSSIBLE NOTICE

We make all kinds of Mill Cogs and have special facilities that will be of great service to you. We make a specialty of "ready dressed" cogs which are

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the moment driven and keyed. Write at once for circular "G" and instruction sheets free.

THE N. P. BOWSHER CO.
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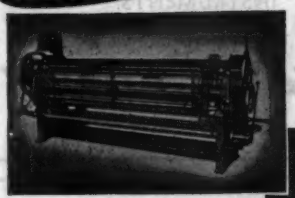

Only two of the many production machines in our line—complete details upon request.

THERE'S still a big job for all of us to do before Victory comes—but discuss today and be ready tomorrow. Early planning will help you do a better job when we can work in peace.

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Produces clean cut rolls of controlled density. Built in widths up to 92" Speeds up to 2,000 F.P.M.

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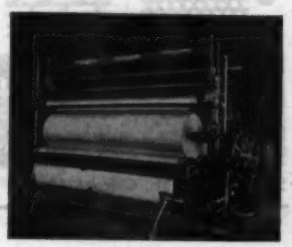

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THE NEW MODEL "E" PAPER TRIMMERS

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No other material equals the smooth, hard surface that is impervious to most chemicals—flushes clean—does not flake, pit or scale—and is free from friction.

Should fins—midfeathers—agitators—round—square or tapered ends, corners and bottoms be needed—the exclusive Kalamazoo method makes it easy to construct and moderate in cost, usually less than reinforced concrete.

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Barking Drums ★ Pulpwood Chippers ★ Flat Screens ★ Pulpwood Slashers ★ Chip Crushers ★ Knot Saws ★ Knot Drills ★ Wood Cleaners ★ Pulp Stock Agitators ★ Fan Pump for Diluted Stock ★ Screen Hold Down Devices ★ Roll Heading Machines ★ Paper Machine Flow Spreader ★ Windershafts ★ Multiple Knife Discs ★ Unit Heaters.

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Specializing in Paper Mill Personnel
Positions Now Open

Development engineer for firm building paper machinery
Resident engineer with mechanical or civil engineer's degree
Technical director for board and liner plant
Salesman, kraft and specialties for the converting trade
Chemists $3,000—$6,500 year
Plant engineers, mechanical engineers, draftsmen, designers and master mechanics
Assistant superintendent absorbent papers
Calender foreman
Finishing foreman
Production engineer for sales development and market research
Tour bosses for cylinder and fourdrinier machines
Beater engineers, machine and back tenders
Comptrollers, office managers and accountants
Salesman for special apparatus to paper mills
And many others

We invite correspondence (strictly confidential) with employers seeking personnel and men seeking new positions. A-19

WANTED

Back Tenders and Third Hands for cylinder machines making folding boxboard. Vertical stack dryers. Permanent positions with highest pay and good opportunity for advancement.

THE BARTGIS BROTHERS COMPANY
Hohester, Maryland
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Catonsville, Maryland
M-3

WANTED

ENGINEERS and DESIGNING DRAFTSMEN experienced in pulp and paper mill design and process by Consulting Engineers. Address Box 45-146 care Paper Trade Journal. T.F.

SUPERINTENDENT wanted for Furniture Bogus Mill near Albany, N. Y. Also Machine Tenders, Back Tenders, Millwright. State all when answering. Address Box 45-204 care Paper Trade Journal. A-26

WANTED—Machine Tender and Back Tender. Apply to George J. Lenz, Supt., Peerless Paper Mills, Oaks, Pa. A-19

CHIEF ENGINEER — Master Mechanic. An exceptional opportunity is offered by paperboard manufacturer making folding grades. Expansion program in immediate future. Write in detail giving educational background, previous connections and salary expected. Address Box 45-205 care Paper Trade Journal. A-19

SUPERINTENDENT for finishing department in large modern midwestern paper converting plant. Must be expert in laminating and coating of paper, plating, stack and friction calendering, and have a good chemistry background in paper and related materials. Knowledge of water-proofing of paper and application of lacquer and plastic coatings necessary. Address Box 45-210 care Paper Trade Journal. TF

CHEMIST—for eastern paperboard mill and folding carton fabrication plant. Experience or training in both branches of field required. Give complete information including personal status and salary expected. Address Box 45-213 care Paper Trade Journal. A-26

WANTED—Superintendent — cylinder machine. Experienced on dry saturating felt. Give references, age, married or single, where employed. Confidential. Pacific Coast. Address Box 45-212 care Paper Trade Journal. A-26

MASTER MECHANIC thoroughly qualified to handle electrical and machine shop work, and take charge of all maintenance in modern wax paper plant. Good salary. Steady employment. Address Box 45-215 care Paper Trade Journal. A-19

WANTED—Working Paper Mill Superintendent —one machine cylinder mill—waste paper furnishes tissue items—looking for man in a rut who wants to make record for self—good salary right man—character references required and investigated—no floaters need apply—write in detail, all applications held confidential. Address Box 45-217 care Paper Trade Journal. A-19

HELP WANTED

SALARIED POSITIONS — This advertising service of 35 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Identity covered and present position protected. Send for details. R. W. BIXBY, INC., 117 Delward Bldg., Buffalo 2, N. Y. tf

SALESMAN for large folding carton and specialty manufacturer. Unusual opportunities. Give full qualifications, age and draft status. Replies held in strictest confidence. EMPIRE BOX CORPORATION, Garfield, N. J. A-19

PLANT MANAGER—Established Philadelphia Plant making high quality bags (self-opening, squares, flats, sacks, specialties) want plant manager experienced in handling production and personnel in union shop. Give full qualifications. Replies held in strictest confidence. Address Box 45-196 care Paper Trade Journal. M-31

WANTED—Engineering Draftsman for Post War Work on Paper Mill Machinery. Experience in Paper Mill equipment design helpful. Location: Appleton, Wisconsin. EMPLOYER: Old established paper machinery builder. Excellent future opportunity. Address Box 45-219 care Paper Trade Journal. M-3

WANTED — Licensed Steam Engineer. One capable of handling maintenance and operation in paper mill on Pacific Coast. Apply in own handwriting stating experience, references and salary wanted. Address Box 45-244 care Paper Trade Journal. TF

EXPERIENCED PRACTICAL ELECTRICAL ENGINEER for Midwest pulp and paper mill. Please state age, education, experience and draft status. Also salary desired. Address Box 45-240 care Paper Trade Journal. M-3

WANTED—CHIEF CHEMIST for pulp and paper mill located on Pacific Coast. Apply in own handwriting giving references, experience and other pertinent information. Address Box 45-243 care Paper Trade Journal. TF

SITUATIONS WANTED

ENGINEER—M. E. training. Background of 20 years in the paper and pulp industry in engineering and managing capacity. Qualified and experienced in supervising power, construction, maintenance and operation. Kraft or sulphite. Available on short notice. Address Box 45-198 care Paper Trade Journal. A-19

PRODUCTION MAN—Thoroughly experienced in production and supervision all varieties fine cardboards. Successful record personnel relations. Address Box 45-4 care Paper Trade Journal. A-26

WANTED POSITION as Trouble Shooter or Production Manager. One mill or a group of mills. Cylinder or fourdrinier machines. Can go anywhere. Satisfaction guaranteed or no pay. Would consider Superintendent with chance for advancement. Address Box 45-201 care Paper Trade Journal. A-19

DIRECTOR OF PURCHASES — Thoroughly experienced in contracting, selection of materials, expediting, disposal of surplus, initiating use of new materials, inventory control, material control, acceptance, subcontracting, traffic and inspection of materials needed to operate a pulp and paper mill. Conscientious, aggressive and capable. Address Box 45-203 care Paper Trade Journal. A-19

INDUSTRIAL RELATIONS DIRECTOR — Now employed. Experienced all phases labor relations and personnel management, job evaluation, W. L. B., union negotiations, wage stabilization, etc. Age 34, B.A. and L.L.B. degrees. References. Address Box 45-207 care Paper Trade Journal. A-19

MECHANICAL ENGINEER with fifteen years experience in tissue manufacture and conversion. Best of references as to ability as producer and executive. Age 45 years. Address Box 45-226 care Paper Trade Journal. A-19

SUPERINTENDENT Finishing and Shipping or Paper Converting Plant. Years broad practical experience. Proficient equipment operation Mfg. and Converting, order scheduling, inventories, etc. Wrapping Tissue, Envelope, Bonds, Book, News, Waxed, Oiled, Specialties. Available at once. Address Box 45-214 care Paper Trade Journal. M-3

SITUATIONS WANTED

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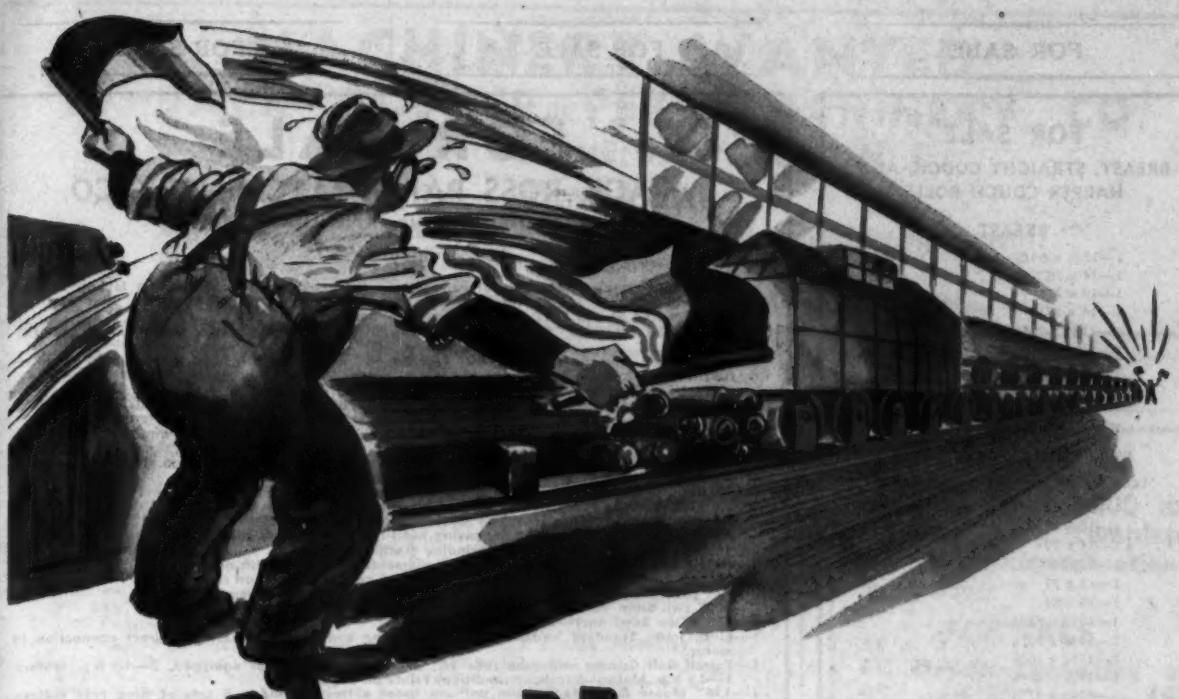

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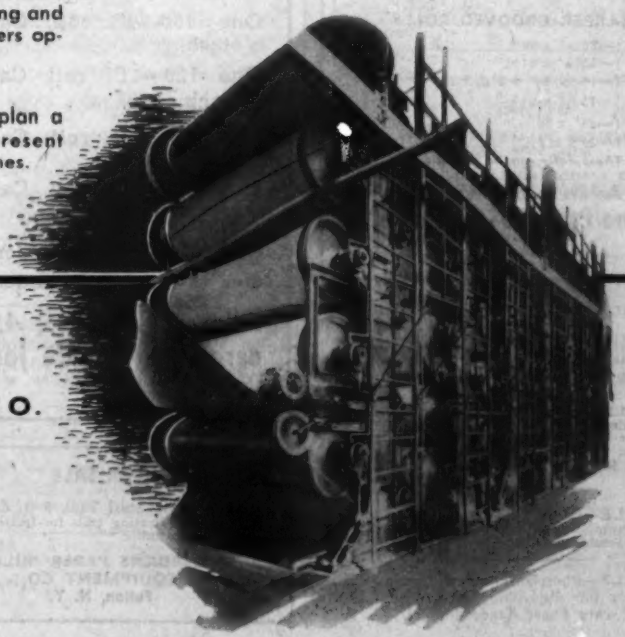

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1—12 1/16 x 64 1/16
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1—14 11/16 x 85 1/16
1—17 1/16 x 86 11/16
1—17 1/16 x 87 1/16
1—17 3/4 x 87 1/16
1—18 x 89
1—20 x 90
1—19 3/4 x 96
1—14 3/4 x 97 3/4
1—14 1/16 x 98 1/16
1—17 1/16 x 106
1—18 x 106
1—17 1/16 x 106
1—21 3/4 x 106
1—19 1/16 x 108
1—21 1/16 x 113
1—17 11/16 x 119
1—17 11/16 x 119
1—20 x 122
1—19 11/16 x 122
1—17 11/16 x 124
1—19 1/16 x 124
1—19 1/16 x 124
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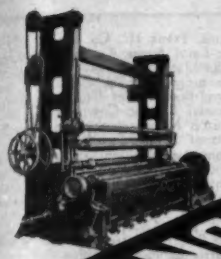

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Traylor Engineering & Mfg. Co
Union Machine Company
Union Screen Plate Co.
Valley Iron Works Co.
Walworth Company

CENTRIFUGAL MACHINERY
Bird Machine Co.
De Laval Steam Turbine Co.
Nichols Engrg. & Research Corp
Ross J. O. Eng. Co.
Shartle Brothers Machine Co.

CHEMICALS
Aktivin Corporation
Amer. Cyanamid & Chem. Corp
Ansul Chemical Co.
Calco Chemical Co.
Diamond Alkali o.
Dispersion Process Inc.
Dow Chemical Company
E. I. du Pont de Nemours & Co., Inc
General Dyestuff Corp.
Geigy Co., Inc.
Gottesman & Co.
Hooker Electrochemical Company
The Mathieson Alkali Works, Inc.
Monsanto Chemical Company
The Neville Company
National Oil Products Co.
Naugatuck Chemical Div. of U. S Rubber Co.
Niagara Alkali Company
Paper Makers Chemical Department, Hercules Powder Co.
Pennsylvania Salt Mfg. Co.
Pioneer Salt Company
Pittsburgh Plate Glass Co., Columbia Chemical Division
Solvay Sales Corp.
Stauffer Chemical Company
United States Rubber Co.
Witco Chemical Co.
Wyandotte Chemicals Corp.

CLEANING MATERIALS
Amer. Cyanamid & Chem. Corp.
Bird Machine Co.
E. I. du Pont de Nemours & Co., Inc
Oakite Products, Inc.
Paper Makers Chemical Department, Hercules Powder Co.
Magnus Chemical Co.
Nichols Engrg. & Research Corp.
Pennsylvania Salt Mfg. Co.
Philadelphia Quartz Co.
Pittsburgh Plate Glass Co., Columbia Chemical Division
Solvay Sales Corp.
Wyandotte Chemicals Corp. J. B. Ford Division

CLUTCHES
Appleton Machine Co.
Black-Clawson Company
Hudson Sharp Machine Company
Farrel-Birmingham Co.
Fawick Airflex Co., Inc.
Horton Manufacturing Co.
Rodney Hunt Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
Stearns Magnetic Mfg. Co.
Valley Iron Works Co.
T. B. Wood's Sons Company

COATING MACHINERY
Hudson Sharp Machine Company
Moore & White Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corporation, John
Weber, Herman G.

COMPRESSORS
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
Ingersoll-Rand Co.
Nash Engineering Co.
Worthington Pump & Machinery Corp.

CONSULTING ENGINEERS
W. H. L. D. Betz
Frederic C. Clark
Ferguson, Hardy S
Hardy, George F
Johnson & Wierk, Inc.
The Kohler System Company
Main, Inc., Chas. T.
J. E. Sirrine & Co.
Stone & Webster Engrg. Corp.

CONVEYORS
Black-Clawson Company
Murray, D. J. Mfg. Co.
Ross Engineering Corp., J. O.

CORES
Elizman Paper Co.
Sonoco Products Co.
Rodney Hunt Machine Co.
Montague Machine Co.
Smith & Winchester Mfg. Co
Walker-Goulard-Plehn Co.

COUPLINGS
Black-Clawson Company
De Laval Steam Turbine Co.
Farrel-Birmingham Co., Inc.
The Frederick Iron & Steel
E. D. Jones & Sons Co.
Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works
Waldron Corp., John
Westinghouse Electric Mfg. Co.
T. B. Wood's Sons Company

CUTTERS
Thomas W. Hall Co.
Noble & Wood Mach. Co.
Perkins & Son, Inc., B. F.
The Smith & Winchester Mfg. Co
Taylor Stiles & Co.

DAMPENERS
Perkins & Son, Inc., B. F.
Valley Iron Works Co.

DE-INKING
Kinsley Chemical Co.

DIGESTERS
The Biggs Boiler Works Co.
H. K. Porter Company Inc.
Pusey & Jones Corp.

DOCTORS
Bird Machine Company
Black-Clawson Company
Downingtown Mfg. Co.
Lobdell Co.
Montague Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DOCTOR BLADES
Black-Clawson Company
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Montague Machine Co.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Simonds Worden White Co.
Shartle Brothers
United States Rubber Co.
Westinghouse Electric & Manufacturing Company

DRIERS
Black-Clawson Company
Murray Mfg. Co., D. J.
J. J. Ross Company
Ross, J. O. Engineering Corp.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

DRIVES
Allis-Chalmers Mfg. Co.
Appleton Machine Co.
Bird Machine Co.
Black-Clawson Company
Davis, Frank H., Co.
De Laval Steam Turbine Co
Dilts Machine Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
General Electric Company
Horton Manufacturing Co.
Rodney Hunt Machine Co.
Montague Machine Co.
Moore & White Co.
Murray, D. J. Mfg. Co.
Noble & Wood Machine Co.
Pusey & Jones Corp.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
T. B. Wood's Sons Co.
Valley Iron Works Co.
Westinghouse Electric & Manufacturing Company

DUSTERS
Appleton Machine Co.
Downingtown Mfg. Co.
E. D. Jones & Son Co.
Moore & White Co.
Noble & Wood Machine Co
Norwood Engrg. Co.
D. J. Murray Mfg. Co.

DYESTUFFS
Calco Chemical Co.
Ciba Company
E. I. du Pont de Nemours & Co
Geigy Co., The
General Dyestuff Corp.
National Aniline Division, Allied Chemical & Dye Corp
Paper Makers Chemical Department Hercules Powder Co.
C. K. Williams & Co.
Witco Chemical Co.

EVAPORATORS
Black-Clawson Company
Goslin-Birmingham Mfg. Co., Inc
Murray, D. J., Mfg. Co.
Traylor Engineering & Mfg. Co

FANS
General Electric Co.
B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O

FEEDERS
Merrick Scale Mfg. Co.
Leeds & Northrup
Traylor Engineering Co.
Wallace & Tiernan

FELTS
Appleton Woolen Mills
Asten-Hill Mfg. Co.
Bloomfield Woolen Co.
Bulkley, Dunton Pulp Co Inc.
Draper Bros. Corp.
Pitchburg Duck Mills
Huyck & Son, F. C.
Lockport Felt Co.
Mt. Vernon-Woodbury Mills, Inc.
Morey Paper Mill Supply Co
Orr Felt & Blanket Co.
Shuler & Benninghofen
Waterbury Felt Co.
Woodward, Baldwin & Co.

FELT GUIDES
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co
Waldron Corp., John

FILLERS
American Colloid Co.
Amer. Cyanamid & Chem. Corp
International Pulp Co.
W. H. Loomis Talc Corp
Union Talc Co.
Vanderbilt Co., R. T.
Witco Chemical Co.

FILTERS
Moore & White Co.
J. O. Ross Engrg. Corp.
Worthington Pump & Mchy. Corp
Witco Chemical Co.

FLOORING, GRATING & TREADS
Hendrick Mfg. Co.
Klemp, W. F., Co.
Norton Co.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc
Robinson, C. P.
United States Rubber Co.

FORMING MACHINES
Downingtown Mfg. Co.
Noble & Wood Machine Co.
Oliver United Filters
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

WHERE TO BUY

GEARS
Black-Clawson Company
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

GRINDERS
Covel-Hanchett Co.
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
Montague Machine Co.
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Works

GRINDING WHEELS
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Simonds Worden White Co.
United States Rubber Co.

HEATING, VENTILATING AND AIR CONDITIONING
The Appleton Machine Co.
Armstrong Machine Works
E. D. Jones & Sons Co.
General Electric Co.
Grinnell Company
Leeds & Northrup
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
Ross Engineering Corp., J. O.
Shartle Brothers Machine Co.
Valley Iron Works Co.
Worthington Pump & Mchy Corp.

HOISTS
Appleton Machine Co.
Dilts Machine Works
Rodney Hunt Machine Co.
Ingersoll-Rand Co.
E. D. Jones & Sons Co.

HOSE (Air, Water, Suction, etc.)
The Cincinnati Rubber Mfg. Co.
The Manhattan Rubber Manufacturing Division of Raybestos-Manhattan Inc.
United States Rubber Co.

INSTRUMENTS, TESTING AND MEASURING
W. H. & L. D. Betz
H. P. Bowsher
The Foxboro Company
General Electric
W. & L. E. Gurley
Leeds & Northrup Company
National Technical Laboratories
B. F. Perkins & Son
Taylor Instrument Cos.
Wallace & Tiernan Co., Inc.
Westinghouse Electric & Manufacturing Company
Wilkens-Anderson Co.

JORDAN FILLINGS
Appleton Machine Co.
Behr Brothers Mfg. Co.
E. D. Jones & Sons Co.
Noble & Wood Machine Co
Shartle Brothers Machine Co
Smith & Winchester Mfg. Co
Valley Iron Works Co.

KNIVES
Black-Clawson Company
Dilts Machine Works, Inc.
Hamblet Machine Co.
E. D. Jones & Sons Co.
Simonds Worden White Co.
Valley Iron Works Co.

LABORATORY EQUIPMENT
Appleton Machine Co.
W. H. & L. D. Betz
Dilts Machine Works
E. D. Jones & Sons Co.
Leeds & Northrup Company
National Technical Laboratories
Noble & Wood Machine Co.
Taber Instrument Co.
Taylor Instrument Companies
Valley Iron Works Co.

LAY BOYS
Hamblet Machine Co.
Moore & White Co.
Shartle Brothers

LUBRICANTS
Gulf Oil Corporation
Gulf Refining Co.
Sinclair Refining Co.
Socony-Vacuum Oil Co., Inc.
Sun Oil Company
Tide Water Associated Oil Co.

LUBRICATORS
Hills-McCanna Co.

MICROMETERS & CALIPERS
Farrel-Birmingham Co.
Montague Machine Co.
Lobdell Car Wheel Co.
Walker-Goulard-Plehn Co

MIXERS
Youngstown Welding & Engrg. Co.

MOISTENING EQUIPMENT
The Spray Engineering Co.

MOTORS AND GENERATORS
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
General Electric Co.
Ingersoll-Rand Co.
Reliance Electric & Engrg. Co.
Westinghouse Electric & Manufacturing Company

PACKING BOXES
Johnson Corporation
Shartle Brothers Machine Co.

PACKING
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
United States Rubber Co.

PAPER MACHINES
Black-Clawson Company
Downingtown Mfg. Co.
Thomas W. Hall Co.
Moore & White Co.
Pusey & Jones
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester

PAPER MACHINE SLICES
Black-Clawson Company
E. D. Jones & Sons Co.
Montague Machine Co.
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.

PAPER TUBE MACHINERY
Dietz Machine Works
Thomas W. Hall Co.
Hudson Sharp Machine Company
Langston Co., Samuel M.

PASTING MACHINES
Black-Clawson Company
Davis, Frank H., Co.
Murray, D. J., Mfg. Co.
Moore & White Co.
Potdevin Machine Co.
Shartle Brothers Machine Co.
Waldron Corp., John

PERFORATED METAL
Allis-Chalmers Mfg. Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.

PIPE
Black-Clawson Company
Crane Company
Grinnell Company
Shartle Brothers Machine Co.
Taylor Forge & Pipe Works
Walworth Company
Youngstown Welding & Engrg. Co

PLATERS
The Norwood Engineering Company
Perkins & Son, Inc., B. F.

PLATES
Black-Clawson Company
Hendrick Mfg. Co.
Klemp, W. F., Co.
J. O. Ross Engrg. Corp.
Shartle Brothers Machine Co
Timken Roller Bearing Co.

PLUGS
Black-Clawson Company
E. D. Jones & Sons Co.
The Noble & Wood Machine Co.
The Richardson Economy Plug Co.
Shartle Brothers Machine Co.

PRESSES
Black-Clawson Company
Farrel-Birmingham Co.
Dietz Machine Wks.
Thomas W. Hall Co.
Hudson-Sharp Machine Co.
Paper Converting Machine Co., Inc.
Potdevin Machine Co.
Rotogravure Engineering Co.
Shartle Brothers
Valley Iron Works Co.
Waldron Corp., John
Weber, Homer G.

PUG MILLS
Traylor Engineering & Mfg. Co

PULPS
Andersen Co., J.
Bulkley, Dunton Pulp Co., Inc.
Gottesman & Co., Inc.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
Pulp and Paper Trading Co.

PUMPS
Allis-Chalmers Mfg. Co.
Black-Clawson Company
Dorr Company
Downingtown Mfg. Co.
De Laval Steam Turbine Co.
Frederick Iron and Steel Co.
Hills-McCanna Co.
Ingersoll-Rand Co.
Johnson Corp.
Moore & White Co.
Nash Engineering Co.
Noble & Wood Machine Co.
Paper Converting Mch. Co.
Quimby Pump Co. Div. of H. K. Porter Company, Inc.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Warren Steam Pump Company
Worthington Pump & Machinery Corp.

RECOVERY SYSTEMS
Bulkley, Dunton Pulp Co., Inc
Rodney Hunt Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Pusey & Jones
Ross Engineering Corp. J. O.
Valley Iron Works Co.

RECTANGULAR BINS
Traylor Engineering & Mfg. Co.

REELS
Black-Clawson Company
Downingtown Mfg. Co.
De Laval Steam Turbine Co.
Hudson Sharp Machine Company
The Kohler System Company
Montague Machine Co.
Moore & White Co.
Paper Converting Mch. Co.
Rodney Hunt Machine Co.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg. Co.

REFINERS
Appleton Machine Co.
Behr Brothers Mfg. Co.
Bauer Brothers Co.
Dilts Machine Works
The Hermann Manufacturing Co
E. D. Jones & Sons Co.
Murray, D. J. Mfg. Co.
Noble & Wood Machine Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Sprout, Waldron & Co.
Sutherland Refiner Corp.
Valley Iron Works

REGULATORS
Allis-Chalmers Mfg. Co.
Armstrong Machine Works
Bird Machine Company
The Brown Instrument Co.
The Foxboro Company
Jones, E. D., & Sons Co.
General Electric Co.
Johnson Corp.
Leeds & Northrup Company
National Technical Laboratories
Noble & Wood Machine Co.
Shartle Brothers
Taylor Instrument Companies
Wallace & Tiernan
Westinghouse Electric & Manufacturing Company

RESINS
American Cyanamid & Chemical Corp.
The Neville Company
The Resinous Products & Chemical Co.

ROLLS
Appleton Machine Co.
Black-Clawson Company
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Improved Paper Machy. Corp
Lobdell Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc
Montague Machine Co.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
Perkins, B. F., & Sons Co.
Pusey & Jones Corp.
Roehlen Engraving Co.
J. J. Ross Company
Rodney Hunt Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Shenango-Penn Mold Co.
Sinclair Co.
Smith & Winchester Mfg. Co.
Stearns Magnetic Mfg. Co.
United States Rubber Co.
Valley Iron Works Co.
Waldron Corp., John

ROLL COVERS
The Cincinnati Rubber Mfg. Co.
Youngstown Welding & Engrg. Co.

ROLL STANDS
Cameron Machine Co.
Johnstone Eng. & Machine Co.
The Kohler System Company
Moore & White Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.

ROTARY KILNS
Traylor Engineering & Mfg. Co.

SATURATING MACHINES
Black-Clawson Company
Moore & White Co.
Noble & Wood Machine Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman C.

SCALES
Merrick Scale Mfg. Co.

SCREEN PLATES
Fitchburg Screen Plate Co.
Magnus Metal Corp.
Morey Paper Mill Supply Co.
Union Machine Co.
Union Screen Plate Co.

SCREENS
Allis-Chalmers Mfg. Co.
Appleton Wire Works
Appleton Machine Co.
Bird Machine Company
Carthage Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Harrington & King Perforating Co
Hendrick Manufacturing Co.
E. D. Jones & Sons Co.
Montague Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
Valley Iron Works Co.

SCRUBBERS
Traylor Engineering & Mfg. Co.

SHEET MACHINES
Thomas W. Hall Co.
The Hermann Manufacturing Co.
Noble & Wood Machine Co.
Rotogravure Engrg. Co.
Valley Iron Works Co.

SHOWER PIPES
Bird Machine Company
A. E. Broughton & Co.
Downingtown Mfg. Co.
Improved Paper Machy. Corp.
Moore & White Co.
Shartle Bros. Mach. Co.
Smith & Winchester Mfg. Co.

SHREDDERS
Bauer Brothers Co.
Carthage Machine Co.

SIZING
American Cyanamid & Chemical Co.
Black-Clawson Company
The Dow Chemical Co.
du Pont, E. I., de Nemours & Co.
National Oil Products Co.
Paper Makers Chemical Department, Hercules Powder Co.
Pioneer Salt Company
Socony-Vacuum Co.
Philadelphia Quartz Co.

SLITTERS
Black-Clawson Company
Cameron Machine Co.
Carthage Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
Thomas W. Hall Co., Inc.
Hamblet Machine Co.
Hudson Sharp Machine Company
Johnstone Eng. & Machine Co.
Langston Co., Samuel M.
Moore & White Co.
D. J. Murray Mfg. Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Simonds Worden White Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

SPRAY NOZZLES
The Spray Engineering Co.

STARCH
American Cyanamid & Chemical Corp
Clinton Co.
National Starch Products, Inc.
Stein, Hall & Co., Inc.

WHERE TO BUY

STEAM SPECIALTIES
Johnson Corp.
Shartle Bros. Mch. Co.
Stickle Steam Specialties Co.

STRAPPING & STRAPPING MACHINES
The Stanley Works

STUFF CHESTS
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

SUCTION BOXES
Black-Clawson Company
A. E. Broughton & Co.
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Westinghouse Electric & Manufacturing Company.

SULPHUR
American Cyanamid & Chemical Corp.
Stauffer Chemical Company
Texas Gulf Sulphur Co.
Witco Chemical Company

SULPHUR BURNERS
Valley Iron Works Co.

TALC
American Cyanamid & Chemical Corp.
W. H. Loomis Talc Corp.
International Talc Company

TANKS
Frederick Mfg. Co.
E. D. Jones & Sons Co.
Kalamazoo Tank & Silo Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
The Noble & Wood Machine Co.
H. K. Porter Company Inc.
Rodney Hunt
J. O. Ross Engrg. Corp.
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
United States Rubber Co.
Waldron Corp., John
Youngstown Welding & Engrg. Co.

THICKENERS, DECKERS & SAVEALLS
Bird Machine Company
Bulkley, Dunton Pulp Co. Inc.
Carthage Machine Co.
Dilts Machine Works
Dorr Co.
Downingtown Mfg. Co.
Montague Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

TITANIUM
E. I. Du Pont de Nemours & Co.
Titanium Pigment Co.
R. T. Vanderbilt Co.
Witco Chemical Company

TOOLS
Acme Steel Company
Ingersoll-Rand Co.
The Stanley Works
Walworth Company

TRUCKS
Elwell Parker Electric Co.
Wright-Hibbard Ind. Elec. Truck Co.

TRAPS
Armstrong Machine Works
Crane Co.
Grinnel Company
Johnson Corporation
Shartle Bros. Mch. Co.

TUBS
Rodney Hunt Machine Co.
Noble & Wood Machine Co.
Shartle Brothers
Valley Iron Works Co.

TURBINES
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
General Electric Company
Hunt, Rodney, Mach. Co.
Westinghouse Electric & Manufacturing Company
Worthington Pump & Machinery Corp.

USED EQUIPMENT
Frank H. Davis Company
Gibbs-Brower Co.
Thomas W. Hall Co.
Noble & Wood Machine Co.
Rotogravure Engrg. Co.
J. J. Ross Company
Shartle Brothers Machine Co

VALVES
Crane Company
Dilts Machine Works
The Foxboro Company
Hills-McCanna Co.
E. D. Jones & Sons Co.
Kennedy Valve Mfg. Co.
Magnus Metal Corp.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co
The Permutit Company
William Powell Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Taylor Instrument Companies
Valley Iron Works Co.
Walworth Company

VATS & VAT PARTS
Union Machine Co.
Union Screen Plate Co.

WASHERS
Bird Machine Company
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Rodney Hunt Machine Co.
Shartle Brothers Machine Co
Valley Iron Works Co.

WATER CONDITIONING
The Permutit Company

WAXING MACHINERY
Black-Clawson Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

WELDING EQUIPMENT
Allis-Chalmers Mfg. Co.
General Electric Company
Walworth Company
Westinghouse Electric & Manufacturing Company

WET MACHINES
Black-Clawson Co.
Carthage Machine Co.
Downingtown Mfg. Co.
Moore & White Co.
Montague Machine Co.
Noble & Wood Machine Co.
Pusey & Jones Corp.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co
Valley Iron Works Co.

WINDERS AND REWINDERS
Black-Clawson Company
Cameron Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
Thomas W. Hall Co.
Hudson-Sharp Mach. Co.
Langston Co., Samuel M.
Johnstone Eng. & Machine Co
The Kohler System Company
Montague Machine Co.
Moore & White Co.
Paper Converting Mch. Co.
Potdevin Machine Co.
Pusey & Jones Corp.
Rotogravure Engrg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.
Waldron Corp., John

WIRES
Appleton Wire Works
Black-Clawson Company
Bulkley, Dunton Pulp Co. Inc
Cheney Bigelow Wire Works
Hayden Wire Works
International Wire Works
Lindsay Wire Weaving Co.
Shartle Brothers Machine Co

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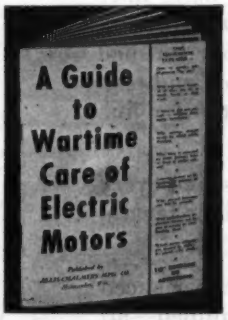

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SYMPTOMS YOU CAN *SEE*

Symptom	Possible Causes	Cure
1. Excessive sparking or flashing at brushes. Blackened commutator.	Rough commutator.	Sand or turn down, depending upon depth of surface roughness.
	Low bar on commutator.	Grind or turn down balance of commutater.
	High bar on commutator.	If extreme, lower with mallet, tightening clamping ring. Grind true.
	Brushes too short.	Replace with harder grade—if worn too soon . . . and not by rough commutator.
	Shorted armature winding.	Test for short—after removing metallic contact between commutator bars. Repair.
2. Intermittent sparking at brushes.	Open armature winding.	Locate and replace bad coil—or repair defective joint.
3. Motor won't start.	Usually line trouble.	Correct. Check source of power supply.
	Load too heavy. See if motor runs without load.	Reduce load—or replace motor with unit of greater capacity.

SYMPTOMS YOU CAN *HEAR*

4. Excessive hum.	Uneven air gap. Measure with feelers.	Replace bearings—before introduction of scraping noise indicates rotor is rubbing.
	Unbalanced rotor. Check on parallel bars.	Balance with solder on band—or weight attached by cap screw and lock washer.
5. Regular clicking.	Matter in air gap.	Take out rotor; remove matter.
6. Rapid knocking	Misalignment.	Realign set until knocking disappears.
7. Brush "chatter."	Extreme vibration.	See item 10, below.

SYMPTOMS YOU CAN *FEEL*

8. Vibration.	Misalignment.	Realign set.
	Vibration in driven machine.	Eliminate source in machine, if possible. Or a flexible belt drive may be in order.
9. Motor overheating. (Check with thermometer—don't depend on hand).	Overload. Measure load; compare with nameplate rating.	Check for excessive friction in motor, drive or machine. Reduce load, or replace motor with greater capacity unit.
	Dirt in motor. Check flow of air.	Blow out motor. Use solvent on wound section if necessary.
	Rotor rubs stator.	Replace bearings.

A 1638

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